A McGRAW-HILL PUBLICATION

Chemical Week

August [illegible] Price 50 cents

Lively as a walk on the moon

Now tired feet say *thank you* to shoe companies for an unusual kind of sole called "closed-cell sponge"—made from some of the types of rubber which Shell Chemical manufactures. It's so light you wonder if it's there, so buoyant you bounce when standing still, and so long-wearing you forget the word "repair."

Secret of this livelier sole is a way of processing synthetic rubber that makes it light and spongy, but keeps it waterproof and tougher than a bride's first piecrust.

Other types of Shell Chemical synthetic rubber are used for tires and toys, for tiles and seat cushions, or any other product that needs this tough, bouncy contribution to the American scene.

SHELL

Shell Chemical Corporation

Chemical Partner of Industry and Agriculture

TORRANCE, CALIFORNIA

VINYLS?

YOU CAN MAKE THEM BETTER WITH GULF ISOOCTYL ALCOHOL

Remember way back when rainwear was heavy and homely? No more. It's high style now . . . when it's made of lightweight, mildew-proof, colorful vinyls.

A good way to control the color and quality of vinyls is to insist on diester plasticizers made with Gulf Isooctyl Alcohol. This high quality alcohol meets the most rigid color requirements . . . is consistently uniform in boiling range and other significant characteristics . . . and is backed by Gulf's unmatched experience in oxo-chemistry. Whatever type of vinyls you're making, chances are you can make them better with Gulf Isooctyl Alcohol.

For more information, write or phone Petrochemicals Department Sales Office, Gulf Oil Corporation, 360 Lexington Avenue, New York 17, New York.

GULF

Quality Chemicals from Petroleum

Benzene • Ethylene • Isooctyl Alcohol • Propylene • Propylene Trimer and Tetramer • Sulfur • Toluene

Chemical Week

TOP OF THE WEEK **AUGUST 29, 1959**

- **Trona hunt is on in Wyoming,** spurred by high costs of building new Solvay-process soda ash plants ..... **p. 40**
- **Natural gum markets are growing steadily,** bolstered by expanding food applications ..... **p. 95**
- **Turn your foreign plant management over to nationals?** Chemstrand does—here's why ..... **p. 105**
- **Pentaerythritol markets are growing again**—after several years of slump. But don't look for new records ..... **p. 117**

COVER PHOTO COURTESY GENERAL DYNAMICS CORP.

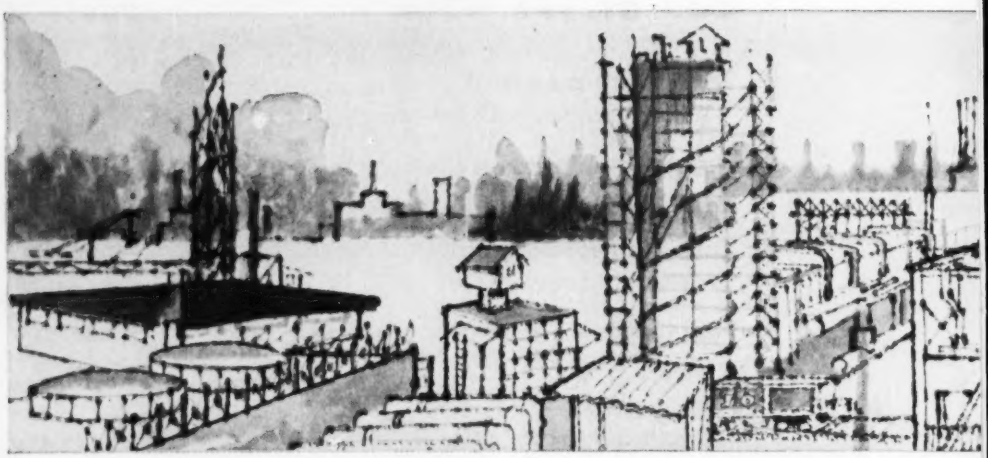
43,623 copies of this issue printed

Vol. 85
No. 9

Chemical Week is published weekly by McGraw-Hill Publishing Co., Inc., 330 W. 42nd St., New York 36, N. Y. Place of publication: 3rd and Hunting Park Ave., Philadelphia 40, Pa. Second-class postage paid at Philadelphia. Subscription: $3/year in U.S.A. Send subscription correspondence and change of address to Fulfillment Manager, Chemical Week. Please see page 7 for subscription requirements.

Postmaster: Please send Form 3579 to Chemical Week, 330 West 42nd St., New York 36, N. Y.

ENGINEERING AT ITS BEST



WHAT YOU SHOULD EXPECT

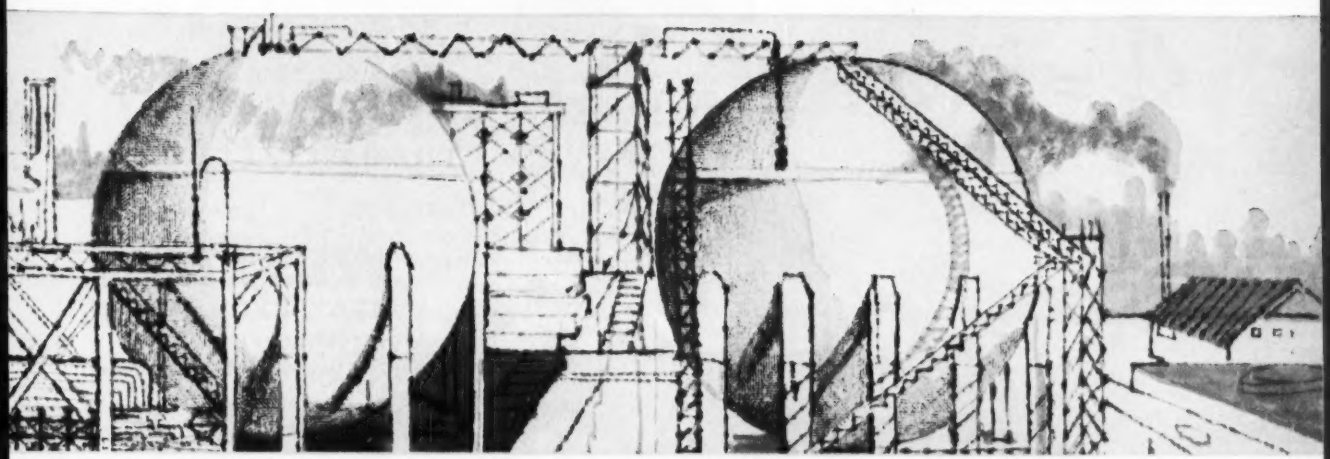
When you go to an engineering firm for help in the design and construction of a new plant, or the expansion of existing facilities, you have a right to expect certain basic standards from that firm. They should have EXPERIENCE, for only with past experience can you minimize the number of new problems which will arise on any new project. Such experience, however, should be tempered with FLEXIBILITY, CREATIVITY and VISION. Some companies are experienced beyond measure at building plants from designs more than 25 years old. In the highly competitive years ahead, such plants could prove economically unsound. You owe it to your company's future to select a firm which has proven its ability to provide the newest and the best in process engineering.

For almost half a century, CHEMICO has maintained a reputation for progressive and imaginative process design and improvement. This proven "know-how" is available to firms in the chemical and petrochemical fields requiring any and all types of engineering and construction services.

WAYS OF WORKING WITH THE CLIENT

A recently completed petrochemical plant offers the best example of the several ways in which CHEMICO is prepared to work with its clients. This huge complex was designed to produce acetylene derivatives, and included processes for producing a wide range of basic chemicals. The ammonia, sulfuric acid and ammonium sulfate sections of this plant were based on *Chemico's own proprietary processes.* The designs for the acrylonitrile and hydrogen cyanide units were based on processes developed in the *client's own pilot plant.* For the acetylene plant, CHEMICO *obtained a license* from BASF in Germany for their patented production-proven process. The oxygen plant was designed by the Linde Company of Germany on a *sub-contract basis.* CHEMICO's Construction Department was responsible for erection of all the plants, and CHEMICO's Industrial Projects Department supervised, coordinated and controlled the entire project.

CHEMICO is always prepared to provide its services to clients on any or all of the bases indicated above. For clients with processes of their own, CHEMICO's Industrial Projects Department will engineer and construct plants, starting at any stage of development. CHEMICO's own laboratories and pilot plant are available, if desired, for process development and improvement work on a contract research basis. If the process to be employed has already undergone pilot stage testing, CHEMICO will design the most economic and efficient commercial scale operation. In such a case, the client can be sure that CHEMICO will call on the services of outstanding engineers and technical personnel with experience similar, or related to the unit operations which are to be designed, engineered and constructed. In addition, the client can be assured that CHEMICO, as an independent engineering organization, will undertake such activities in the framework of a completely confidential relationship,



with all necessary safeguards for protecting the client's competitive position in regard to trade secrets and research developments.

In the case of clients who want plants to produce products for which neither CHEMICO nor the client has a process, CHEMICO, through its Industrial Projects Department, will obtain licenses from whatever source possible for production-proven process designs which will enable the engineering and construction of the desired plant.

Very often CHEMICO's drafting force as well as its specialists in civil engineering, mechanical engineering, electrical engineering and other service engineering capacities can be made available to clients on an individual contract basis. CHEMICO's construction organization, made up of a permanent force of highly experienced construction superintendents, is prepared to undertake a wide range of erection projects related to the process industries.

CONTRACT ARRANGEMENTS

CHEMICO offers its clients a wide choice in the type of contract under which each individual project is to be handled. Among the more common arrangements—although by no means the only ones available—are the following:

Cost Plus Fixed Fee: Under this type of contract, CHEMICO's fee and overhead charge for engineering, construction and related services is decided by mutual agreement, and the client is billed at direct cost for any and all expenses incurred by CHEMICO to complete the client's project.

Lump Sum: At the client's request, CHEMICO submits a firm estimate containing a specific price for which CHEMICO will undertake to complete the client's project.

Guaranteed Maximum: Under this type of contract, CHEMICO will set a maximum cost to the client for an individual project. If the cost of the project falls below the maximum figure, all savings will be divided between CHEMICO and the client on the basis of a prearranged rate.

Fixed Price Equipment Supply: Under this type of contract, the client gets the benefit of CHEMICO's design, engineering, purchasing and expediting services, but is free to make his own arrangements for the construction of his project.

Basic Design and Construction Supervision: This type of arrangement has proved extremely useful in dealing with clients outside the United States. Ordinarily, under a contract of this sort, CHEMICO provides the basic engineering for a project, and the client makes other arrangements for the detailed drawings and construction. CHEMICO then supervises construction and sees the project through start-up operations.

CHEMICO

CHEMICAL CONSTRUCTION CORPORATION
525 West 43rd Street, New York 36, New York

CHICAGO • DALLAS • HOUSTON • PORTLAND, ORE. • TORONTO • LONDON • PARIS • JOHANNESBURG • TOKYO

Chemical Week

Wallace F. Traendly ..... Publisher
Sidney D. Kirkpatrick ..... Editorial Director

Howard C. E. Johnson ..... Editor-in-Chief

Ralph R. Schulz ..... Managing Editor
William Olcott ..... Assistant Managing Editor
J. Robert Warren ..... Assistant Managing Editor
Donald P. Burke ..... Associate Editor
Anthony J. Piombino ..... Associate Editor

DEPARTMENTS

Administration .... Cooper R. McCarthy, *editor;* Leo J. Northart
Business News . Homer Starr, *editor;* Bruce Bendow; Jane B. Munger
Engineering ..... Kenneth C. Wilsey, *editor;* Philip A. Untersee
Markets ..... Jorma Hyypia, *editor;* Philip A. Cavalier
Production ..... Herbert C. Short, *editor*
Reports ..... Vincent L. Marsilia, *editor*
Research ..... Joseph F. Kalina, *editor;* Sanford J. Durst
Sales ..... John M. Winton, *editor;* Carl A. Hiester
Specialties ..... Richard J. Callahan, *editor*
Copy ... William Mullinack, *editor;* Henry S. Gordon, John Philbin
Art ..... Robert T. Martinott, *director;* Richard P. Kluga, Dolores Able
Buyers' Guide ..... E. L. Sisley, *editor;* Betsy L. Emery

REGIONAL EDITORS

Far West . Emil J. Mikity, San Francisco
Southwest ..... James A. Lee, Houston
Midwest ... T. Peter Forbath, Chicago

NATIONAL AND WORLD NEWS

Economics ..... Dexter M. Keezer
Manager, News Bureaus ..... John Wilhelm

Atlanta ..... B. F. Barnes
Chicago ..... Stewart Ramsey
Cleveland ..... Arthur Zimmerman
Dallas ..... Marvin Reid
Detroit ..... Donald MacDonald
Los Angeles ..... Kemp Anderson, Jr.
San Francisco ..... Jenness Keene
Seattle ..... Ray Bloomberg
Washington ..... George B. Bryant, Jr.
Correspondents in 75 principal cities.

Beirut ..... O. M. Marashian
Bonn ..... Morrie Helitzer
Caracas ..... John Pearson
London ..... John Shinn
Melbourne ..... Alicja Grobtuch
Mexico City ..... Peter Weaver
Moscow ..... Robert Gibson
Paris ..... Robert E. Farrell
Tokyo ..... Sol Sanders
Correspondents in 64 principal cities.

Robert S. Muller ..... Advertising Sales Manager

Business Department ..... Alvin J. Babkow, *manager*
Sales Promotion Department ..... Fred E. Lesner, *manager*
Market Service Manager ..... Margaret J. Swikart
Advertising Makeup ..... Robert L. Maier
Advertising Salesmen ..... See Adv. Index, p. 128

Paul W. Erb ..... Circulation Manager
Frances Regan ..... Reprints

AUGUST 29, 1959 **Vol. 85, No. 9**

Chemical Week (including Chemical Specialties and Chemical Industries) is published weekly by McGraw-Hill Publishing Co., James H. McGraw (1860-1948), founder. EXECUTIVE EDITORIAL CIRCULATION and ADVERTISING OFFICES: McGRAW-HILL BUILDING, 360 West 42nd St., New York 36, N.Y. See panel below for directions regarding subscriptions or change of address. Donald C. McGraw, President; Joseph A. Gerardi, Executive Vice-President; L. Keith Goodrich, Vice-President and Treasurer. John J. Cooke, Secretary; Nelson Bond, President, Publications Division; Harry L. Waddell, Senior Vice-President; Ralph B. Smith, Vice-President and Editorial Director; Joseph H. Allen, Vice-President and Director of Advertising Sales; A. R. Venesian, Vice-President and Circulation Coordinator.

Subscriptions to Chemical Week are solicited from management men in the Chemical Process industries in administration, production and plant operation, design and construction, research and development, sales and purchasing. Position, company connection and nature of company's business products and approximate number of employees must be indicated on subscription application. Send to address shown in panel below.

United States and United States possessions subscription rate for individuals in the field of the publication. $3 per year; single copies, 50¢. Foreign subscription rates per year: Canada, $4; other Western Hemisphere countries $15; all others $25, payable in advance. Printed in U.S.A. Title registered in U.S. Patent Office.

Send subscription correspondence and change of address to Fulfillment Manager, Chemical Week, 330 West 42nd St., New York 36, N. Y. Subscribers should notify Fulfillment Manager promptly of any change of address, giving old as well as new address, and including postal zone number, if any. If possible enclose an address label from recent issue of Chemical Week. Please allow one month for change to become effective.

THE BUSINESS MAGAZINE OF THE CHEMICAL PROCESS INDUSTRIES

VIEWPOINT

KHRUSHCHEV'S VISIT is not something that many people are looking forward to. Nobody likes to be blackmailed into inviting any dictator to the U. S. And there is real justice in comparing it to inviting Hitler here in '39—as Sen. Thomas Dodd (D., Conn.) put it: "fresh from conquest of Czechoslovakia, Austria and Poland."

Nonetheless, the chance that some lessening of world tensions may result makes the visit worthwhile. All of us should try to make it a success—perhaps with actions like that taken by American Machine & Foundry Chairman Morehead Patterson. In a letter to AMF employees, he urged that they "make every effort" to cooperate with President Eisenhower "in his efforts to show Mr. Khrushchev a true picture of the United States—strong and peace-loving."

The visit represents an additional challenge to the chemical industry and to the government's chemical specialists. By now, many companies have talked with Russian trade delegations; and even Anastas Mikoyan himself discussed trade with top chemical executives.

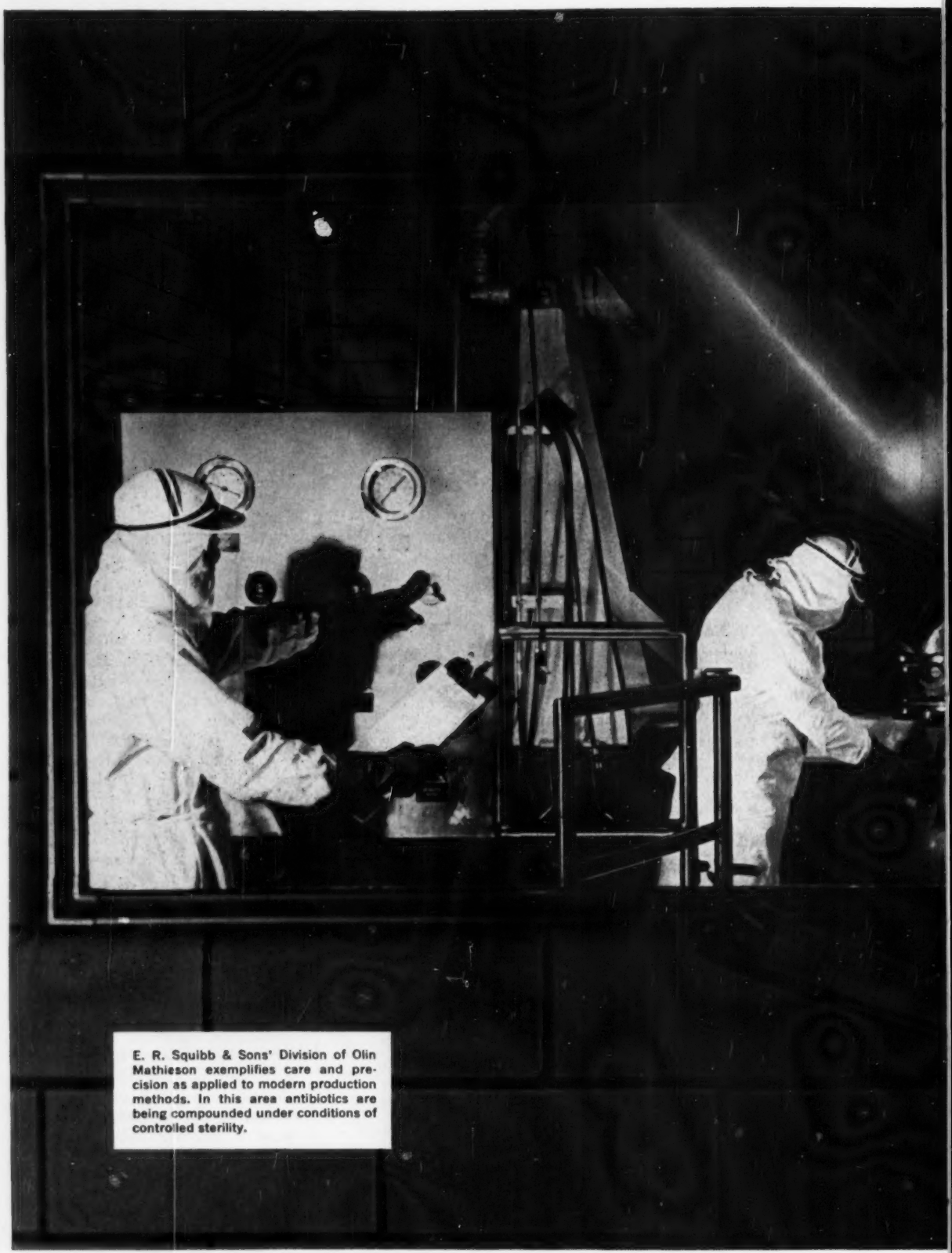
We are sure there is full agreement that there should be no trade of chemical plants and technology that would be valuable to the Russian war mobilization effort. But there may well be areas for profitable and harmless trade in the technology of consumer chemicals.

We get the feeling that industry and government are each looking too hard at the other for guidance. Industry feels that "we shouldn't trade because the government says we shouldn't"; and government officials are not changing their lists of embargoed plants and materials because industry has shown little enthusiasm for trade.

May we then suggest that now is a time for industry and government to sit down together and decide on what should be done. A U.S. proposal to increase trade may in itself cause a decrease in world tensions.

H. C. Johnson

Editor-in-Chief



E. R. Squibb & Sons' Division of Olin Mathieson exemplifies care and precision as applied to modern production methods. In this area antibiotics are being compounded under conditions of controlled sterility.

Rx

to improve your chemical supply

Take one part top-quality chemicals and mix well with on-schedule deliveries, helpful technical assistance, sound market information, flexible transportation facilities . . . that's what chemical buyers get from Olin Mathieson.

Look ahead, too, for new ways in which Olin Mathieson will serve you. Early next year the new SunOlin urea plant comes on-stream, designed to produce material of quality unexcelled anywhere. A six-million-dollar-plus expansion and modernization program at the Niagara Falls caustic/chlorine plant will improve service in this area. And, there'll be other developments announced soon.

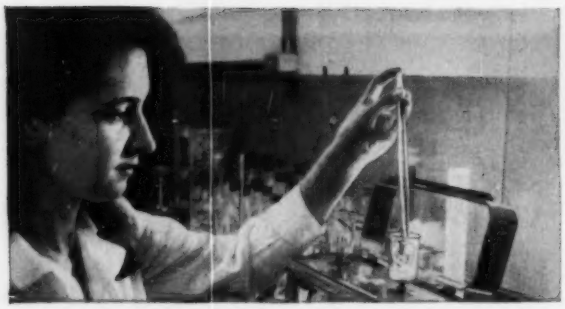
There's no time better than now to take a searching look at your source of chemical supply. If you want a smooth-running extension of your own operations, call Olin Mathieson today.

OLIN MATHIESON
CHEMICAL CORPORATION
Chemicals Division · Baltimore 3, Md.

7170

MATHIESON

Ammonia • Bicarbonate of Soda • Carbon Dioxide • Caustic Soda • Chlorine • Formaldehyde • Hydrazine and Derivatives • Hypochlorite Products
Methanol • Muriatic Acid • Nitrate of Soda • Nitric Acid • Soda Ash • Sodium Chlorite Products • Sodium Methylate • Sulfur (Processed)
Sulfuric Acid • Urea • Ethylene Oxide • Ethylene Glycols • Polyethylene Glycols • Ethanolamines • Glycol Ethers • Surfactants • Ethylene Dichloride



A look at today . . . and a glimpse

The Armeens®

These high molecular weight aliphatic amines are some of the most versatile cationic chemicals made by Armour. The Armeens vary from liquid to solid at room temperature. They range in chain length from 8 to 18 carbon atoms and are essentially insoluble in water—soluble in most solvents. Because of their cationic activity, the Armeens change surfaces from hydrophilic to hydrophobic. This makes them worthy of your study when developing new processes, products, or variations of existing formulas.

There are three series of Armeens:

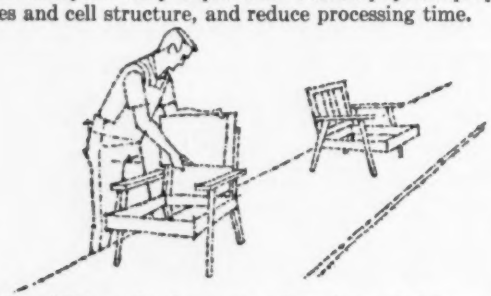
Primary.....$R—NH_2$

Secondary.....$R_2—NH$

Tertiary.....$R—N(CH_3)(CH_3)$ and $N(R)(R)—CH_3$

Where the Armeens work today

Polyurethane foams: Distinct and valuable properties are being imparted to polyurethane by Armour's dimethyl tertiary amines. Armeens DM16D, DM18D, DMCD, DMSD and N-coco Morpholine function as moderately fast catalysts. They improve the foam's physical properties and cell structure, and reduce processing time.



In addition, the Armeens reduce foam shrinkage and increase load-bearing capacities. These chemicals are economical and effective in concentrations of 1 part catalyst per 100 parts resin. They can be dispersed easily into "one-shot" systems or "pre-polymer" systems by proper machine-head agitation.

For more information, check "A" in coupon.

Pigment flushing: Armeen C is a valuable aid when transferring a pigment from its water phase to the oil phase *without intermediate drying and grinding.* Here are two ways the chemical works:

1. Armeen C may be added to the oil phase before mixing with the pigment press cake or slurry. When the treated oil is added to neutral or alkaline slurries, the pigment flushes into the oil phase quickly and easily.
2. Armeen C may be added to an acid pigment slurry, where it is converted to a soluble salt. Because it is cationic, the Armeen salt migrates to the negatively-charged surface of the pigment. This converts a normally hydrophilic pigment to oleophilic. When oil is then added to the slurry, flushing takes place rapidly.

Concentrations required vary from 1 to 7% Armeen C—depending a great deal on the type of pigment being "flushed". In some instances, paint manufacturers have found the acetate salts of the Armeens (the Armacs®) to be equally effective as pigment flushing aids.

More complete data is available. Check "B" in coupon.

Hard rubber mold release: When small particles of rubber stick to hot metallic molds you lose time and money. The problem is being solved by Armeens 18D, HT, and MCA.

Production costs are reduced because the Armeens "migrate" to the rubber-mold interface during the molding process, where they act as internal mold release agents. In addition, these chemicals help improve the reproduction of small lettering and filigree work on the molded items.

As little as 0.5 to 3% of an Armeen (basis: weight of the rubber hydrocarbon) is effective as a release agent for such hard rubber products as bowling balls, combs, valves and battery cases.

Find out more. Check "C" in the coupon.

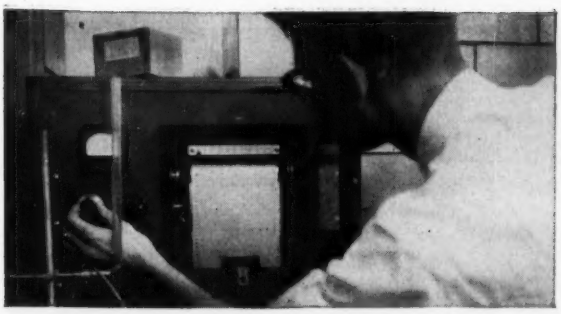
Latex freeze-thaw stabilization: Both natural and synthetic rubber latices are protected by Armeen SZ against freezing. This alkali metal salt of N-coco beta-aminobutyric acid is effective at very low concentrations. And, in addition to preventing irreversible damage to latex emulsions, Armeen SZ also offers a degree of protection against mechanical degradation.

Check "D" in coupon for more data.

Pigment coating: Armeen Z—Armour's N-coco beta-aminobutyric acid—is being widely used as a pigment coating aid for Prussian Blue. 1 to 3% of the Armeen (basis: weight of the pigment) is most efficient in softening and dispersing Prussian Blue in an oleoresinous vehicle.

Check "E" in the coupon for more information.

Other applications: Several of the Armeens and their related derivatives are being used as flotation agents for non-metallic minerals such as potash, phosphate, feldspar, etc. Other Armeens are finding use as fuel oil additives, corrosion inhibitors in gasolines, chemical intermediates, and in many other varied uses.



# of tomorrow

from Armour Chemical

The Armeens: Tomorrow

Many tests and developmental projects with the Armeens are being conducted by Armour and other corporations.

For example, a preliminary screening test for determining their oil wettability has been developed by Armour. Actually a modified ASTM Steam Turbine Oil Test, it enables our laboratory to quickly check the potential of the Armeens as corrosion inhibitors in oil-water systems.

%Oil Wettability of Armeens (in Iso-Octane)

Chemical	Concentration in ppm 10	50	100	1,000	10,000
Armeen HT	40%	40%	60%	96%	98%
Armeen 2HT	5%	5%	30%	60%	90%
Armeen DMHT	5%	5%	30%	40%	80%
Armeen M2HT	5%	5%	30%	70%	80%

The test:

1) Add the desired amount of chemical to 250 ml oil in a 400 ml beaker.
2) Add 25 ml H_2O.
3) Agitate the mixture with a magnetic stirrer for 1 minute.
4) Suspend a test coupon, as specified in ASTM Turbine Oil Test (D 665-54), in the solution for 30 seconds.
5) Examine the coupon visually for water droplets. Place the chemicals in their proper order of oil wettability by the number of water droplets that have remained on the coupon.

This simple screening test has shown a direct correlation between oil wettability and corrosion inhibition properties of Armour Armeens.

The Armeens are just one group of Armour's cationic corrosion inhibitors. Duomeens® and Arquads® are some of the other Armour chemicals being used to solve corrosion problems in many varied industries.

Look to Armour for future announcement on other new tests and applications for the Armeens.

For more test data, check "F" in coupon.

Test and evaluate the Armeens. One of these versatile cationic chemicals may be the additive or starting material you're looking for. Send the coupon—or call Armour today.

NEWS NOTES

Chicago. Armour and Company announces its Chemical and Ammonia Divisions have been combined to form the Armour Industrial Chemical Company. The new organization will have its general offices at 110 North Wacker Drive, Chicago 6, Illinois.

•

Oakville/Toronto, Ontario. The Armour Industrial Chemical Company has established a Canadian sales office here to service Canadian industries with technical assistance in the use of cationic chemicals. Supplies of Armour Chemicals are now available from Canadian production facilities and local inventories.

•

Washington, D.C. U. S. patent #2,792,940 was recently issued to Armour for a new method of concentrating titanium oxide minerals in beach sands.

•

Chicago. A 1,000,000 gallon water supply system here, infected with heavy algae growth and its condenser tubes covered with slime, was quickly cleaned up with weekly treatments of 150 pounds of an amine salt.

Leader in Progressive Fatty Acid Chemistry

Armour Industrial Chemical Company

a Division of Armour and Company

How can the Armeens help solve one of your problems?

Check here for more information on specific applications.

☐ A ☐ B ☐ C ☐ D ☐ E ☐ F

Send a sample for this application:

_____

_____

NAME_____

POSITION_____

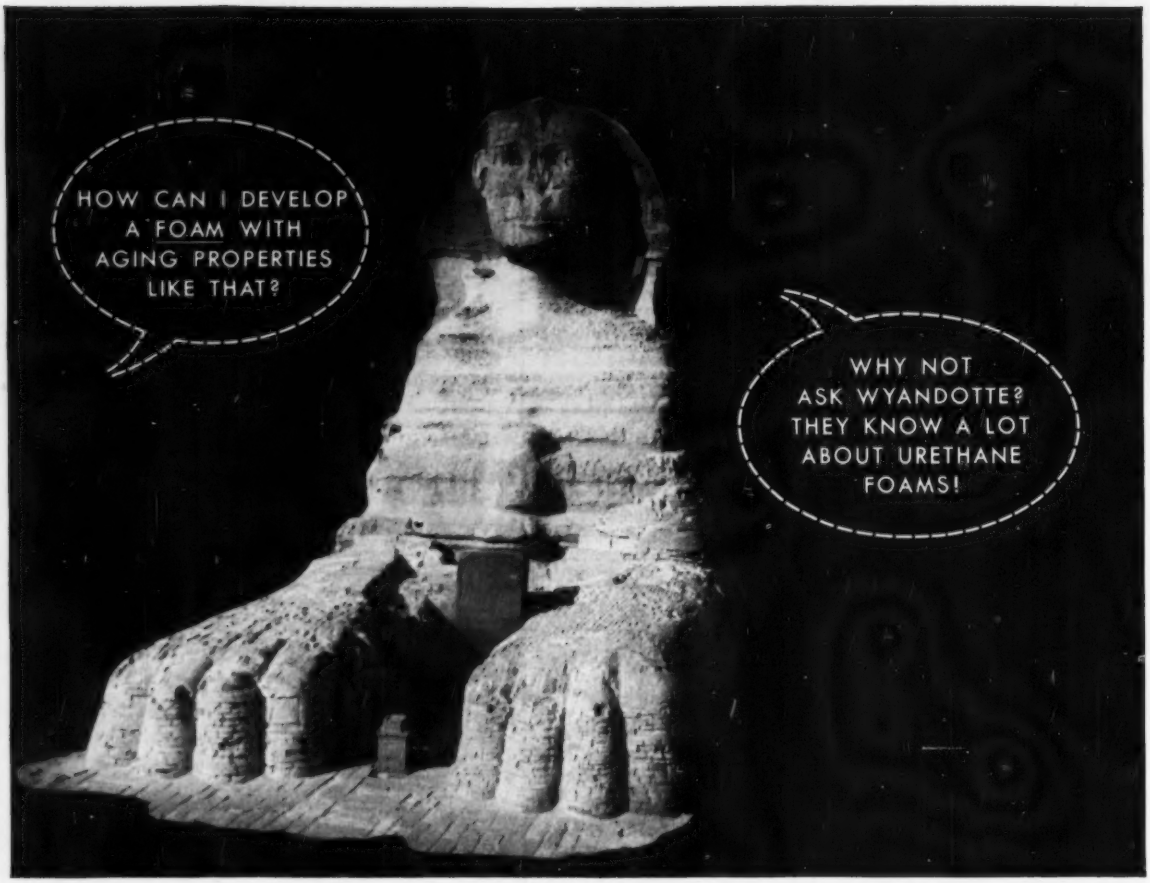
COMPANY_____

ADDRESS_____

CITY_____ STATE_____

CW-8-59

Armour Industrial Chemical Company
110 North Wacker Drive • Chicago 6, Ill.



The sphinx speaks but rarely . . . and then words of surpassing wisdom. Wyandotte *does* know a lot about urethane foams, having played a vital role in the development of the polyethers that have extended foam's useful life — to open the way for countless new applications.

Example: Polyether-based foams excel as cushioning materials, and not only because of their superior aging properties. They have excellent strength-to-weight ratios, and permit accurate control of degrees of resilience and load-bearing characteristics.

Whatever your application . . . take advantage of Wyandotte's experience, draw on Wyandotte products to get the combination of properties you need in urethane foam. Write, stating your requirements, for samples and pertinent data. *Wyandotte Chemicals Corporation, Dept. 801-W, Wyandotte, Michigan. Offices in principal cities.*

Improve your formulation with Wyandotte's urethane-foam raw materials

PLURONIC® Polyols — A series of related difunctional block-polymers terminating in primary hydroxyl groups possessing increased reactivity in polyurethane formulations.

PLURACOL® P Diols — A series of polypropylene glycols which impart excellent resilience and strength properties to flexible foams.

PLURACOL TP Triols — The lower members of this new series are excellent for the production of rigid foams.

TETRONIC® Polyols — Tetra-functional series of polyethers for improved resilience and moldability.

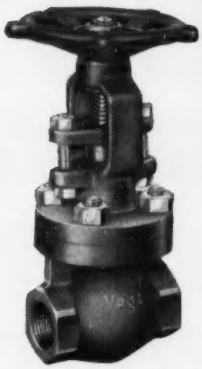
QUADROL® — A very reactive cross-linking agent and catalyst . . . a solvent for fluorinated hydrocarbons used as blowing agents in foams.

DHP-MP — A chemically reactive amine catalyst with extremely low odor.

Wyandotte CHEMICALS MICHIGAN ALKALI DIVISION

PACING PROGRESS WITH CREATIVE CHEMISTRY

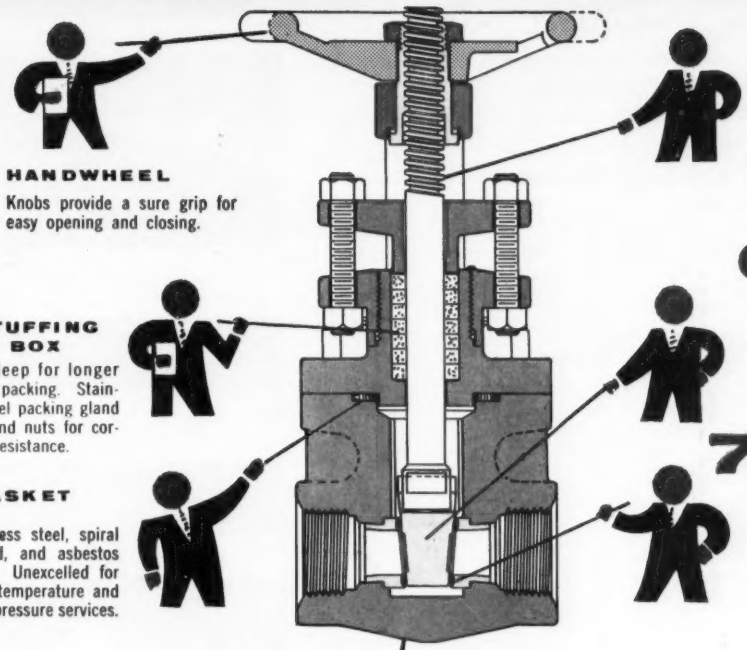
SODA ASH • CAUSTIC SODA • BICARBONATE OF SODA • CALCIUM CARBONATE • CALCIUM CHLORIDE • CHLORINE • MURIATIC ACID • HYDROGEN • DRY ICE
GLYCOLS • SYNTHETIC DETERGENTS • SODIUM CMC • ETHYLENE OXIDE • ETHYLENE DICHLORIDE • POLYETHYLENE GLYCOL • PROPYLENE OXIDE
PROPYLENE DICHLORIDE • POLYPROPYLENE GLYCOL • DICHLORODIMETHYLHYDANTOIN • CHLORINATED SOLVENTS • OTHER ORGANIC AND INORGANIC CHEMICALS



150-800 POUNDS SERVICE
2000 POUNDS COLD, W.O.G.
SIZES ¼" THRU 2"

A NEW Vogt

with 7 superior features



1 HANDWHEEL
Knobs provide a sure grip for easy opening and closing.

2 STUFFING BOX
Extra deep for longer life of packing. Stainless steel packing gland studs and nuts for corrosion resistance.

3 GASKET
Stainless steel, spiral wound, and asbestos filled. Unexcelled for high temperature and high pressure services.

4 FORGED STEEL BODY
Forged materials are uniform in structure, fine grained, and free from porosity. Hexagon ends for easy installation.

5 STEM
13% Chrome stainless steel. A special high melting point alloy yoke nut assures prolonged wear resistance.

6 WEDGE
13% Chrome stainless steel of approximately 500 Brinell for longer wear.

7 SEATS
13% Chrome stainless steel, hard faced with *HAYNES STELLITE or equivalent for stubborn resistance to seat wear.

Seating surfaces are precision machined to close tolerances for drop tight operation. Rigid inspection of finished parts is followed, after assembly, by final pressure tests of body and seats.

Address Dept. 24A-FCW.

*Trade mark of Union Carbide Chemicals Co.

Vogt

GENERAL GP PURPOSE

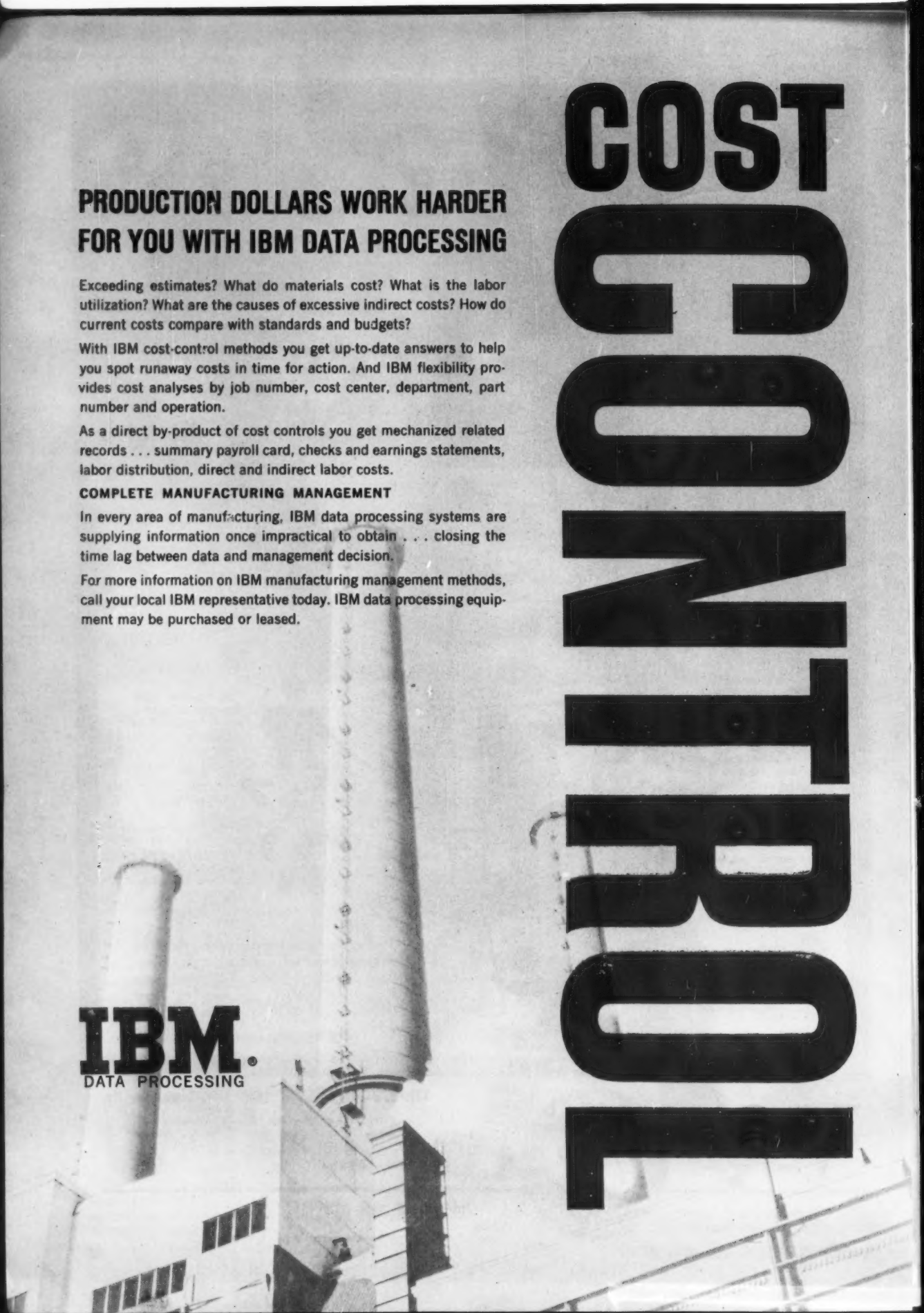
Vogt FOR BETTER VALVES

HENRY VOGT MACHINE COMPANY, Louisville, Ky.

SALES OFFICES: New York, Chicago, Cleveland, Dallas, Camden, N. J., St. Louis, Charleston, W. Va., Cincinnati.

FORGED STEEL

VALVES



PRODUCTION DOLLARS WORK HARDER FOR YOU WITH IBM DATA PROCESSING

Exceeding estimates? What do materials cost? What is the labor utilization? What are the causes of excessive indirect costs? How do current costs compare with standards and budgets?

With IBM cost-control methods you get up-to-date answers to help you spot runaway costs in time for action. And IBM flexibility provides cost analyses by job number, cost center, department, part number and operation.

As a direct by-product of cost controls you get mechanized related records . . . summary payroll card, checks and earnings statements, labor distribution, direct and indirect labor costs.

COMPLETE MANUFACTURING MANAGEMENT

In every area of manufacturing, IBM data processing systems are supplying information once impractical to obtain . . . closing the time lag between data and management decision.

For more information on IBM manufacturing management methods, call your local IBM representative today. IBM data processing equipment may be purchased or leased.

IBM®
DATA PROCESSING

OPINION

More on Nomenclature

TO THE EDITOR: The recent discussion in CHEMICAL WEEK devoted to chemical notation systems (*CW, July 4, p. 48; Aug. 15, p. 13*) is most timely. I have long had a growing conviction that *names* for complicated compounds are of very little value, even for indexing, since it takes an expert to make interconversions between names and structures accurately. And even then, the process is laborious.

This situation has led me to follow with particular interest the development of notation systems. I was impressed by the introduction of the Dyson system, and much credit goes to its developer for being a prime mover in the field. However, with all respect to a great chemist, I consider his system is inferior in many gross ways to the Wiswesser system which followed it. I am convinced that the Dyson system is based on principles that render it incapable of general applicability. The Wiswesser system, on the other hand, continues to demonstrate its remarkable adaptability combined with lucid simplicity.

It therefore dismays me to learn that the Dyson system may be adopted, even internally, by *Chemical Abstracts*. I regard *Chemical Abstracts* as the legitimate concern of all of us, and I hope that it will not make a premature and ill-advised decision.

I also feel that the reported intent of the IUPAC commission to reiterate its adoption of the Dyson system is most alarming; if such an event occurs, my faith in the usefulness and competency of IUPAC as an international organization will be undermined.

PETER A. S. SMITH
Professor of Chemistry
The University of Michigan
Ann Arbor

TO THE EDITOR: . . . I was one of 100 volunteers in the original "field testing" of the four notation systems—those of Dyson, Wiswesser, Gruber and Silk.

Our Southeastern team met at Charleston, W. Va., and compared results, with the conclusion overwhelmingly in favor of Wiswesser's notation system. I feel sure that other teams arrived at the same decision, but the compiled information was never made public.

In my own experience, I found that Wiswesser's "Line Formula Notation" was easier to learn, easier to remember, and much shorter than Dyson's "Central Component System." While our field testing did not check cataloging potential, it certainly seems that Wiswesser's system is vastly superior there, too.

KENNETH S. WARREN
Oak Ridge National Laboratory
Oak Ridge, Tenn.

CW herewith cries "uncle" to further letters on chemical notation. As reported here two weeks ago, Chemical Abstracts *informs us it does not intend to adopt a new notation system in the near future.*

It should be stated, further, that CA *has recommended a standard notation system for many years—and yet, it reports that over 90% of the material submitted to it does not follow this system.*—ED.

MEETINGS

Gordon Research Conferences: At Colby Junior College, New London, N.H.—cancer, Aug. 31-Sept. 4. At New Hampton School, New Hampton, N.H.—chemistry of adhesion, Aug. 31-Sept. 4. At Kimball Union Academy, Meriden, N.H.—molten salts, Aug. 31-Sept. 4.

Chemical Institute of Canada, Physical Chemistry Subject Division; symposium on mass spectrometry in chemistry; McMaster University, Hamilton, Ont., Aug. 30-Sept. 1.

1959 Cryogenic Engineering Conference; subjects: cryogenic processes, applications, equipment, properties; University of California, Berkeley, Sept. 2-4.

Technical Assn. of the Pulp and Paper Industry, fundamental research — wet-strength conference, Institute of Paper Chemistry, Appleton, Wis., Sept. 9-11.

Armed Forces Chemical Assn., 14th annual meeting; theme: future chemical requirements of the armed services; Statler-Hilton Hotel, Washington, D.C., Sept. 10-11.

Society of the Plastics Industry, Midwest section conference, Sheraton Hotel, French Lick, Ind., Sept. 10-11.

American Ceramic Society, structural clay products division meeting, Alfred University, Alfred, N.Y., Sept. 10-12.

American Chemical Society, national meeting, Atlantic City, N.J., Sept. 13-18.

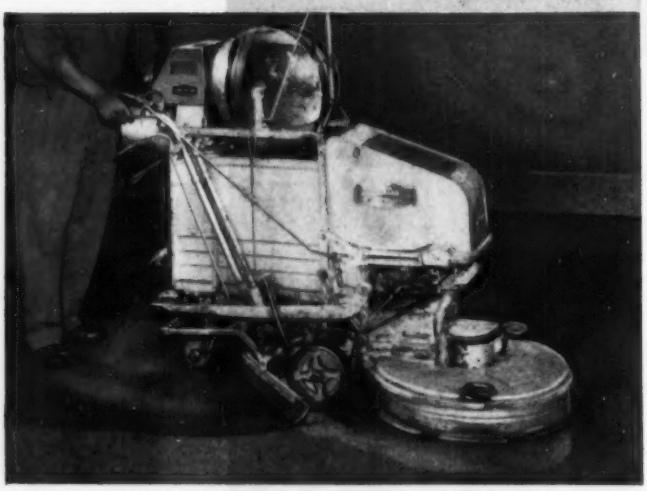
Canadian Agricultural Chemicals Assn., seventh annual meeting, Chateau Frontenac, Montreal, Sept. 20-23.

NINOL 1301

NEW TYPE AMIDE PROVIDES CLEAR SOLUBILITY IN HARD WATER AND MAXIMUM STABILITY

STEPAN CHEMICAL COMPANY

NINOL



OUTSTANDING FOR USE IN

- SYNTHETIC LIQUID FLOOR CLEANERS
- WAX STRIPPERS
- ALKALI CLEANERS
- DETERGENT SANITIZERS

This Stepan product is a completely new and different type of fatty acid alkylolamide detergent derived from coconut oil. Among its distinctive advantages over the usual amides, Ninol 1301 offers the following: **HARD WATER CLARITY.** Clearly soluble in hard water. There is none of the usual haze or turbidity and this carries over to the formulated cleaners based on Ninol 1301. It is soluble in water at all concentrations. **COMPATIBILITY WITH QUATERNARIES.** Disinfectant cleaners can be formulated from Ninol 1301 and quats with excellent clarity and viscosity. **ALKALINE STABILITY.** Completely stable to boiling in alcoholic potash, making it possible to use Ninol 1301 in highly alkaline liquids. **COLOR.** In the very light yellow range, making it possible to dye formulations to any particular shade. **ACTIVITY.** Virtually 100% active, giving maximum detergency per pound. Write for samples, prices, literature.

STEPAN
CHEMICAL
COMPANY

427 W. Randolph St.
Chicago 6, Illinois
STate 2-4711

STEPAN CHEMICAL COMPANY
427 W. Randolph Street
Chicago 6, Illinois

Gentlemen: Please send me complete information, prices and a sample of NINOL 1301.

Name.....

Firm.....

Street Address.....

City..... Zone..... State.....

Business Newsletter

CHEMICAL WEEK
August 29, 1959

Chemical stock prices have been fluctuating sharply in the past week, along with most industries, partly as a result of the steel strike. After stock prices rose to all-time highs in late July, they sagged—mostly in the Aug. 7 and 18 trading sessions—to Aug. 19 levels that were the lowest since June. Examples of stock price drops from July peaks to Aug. 19 low points: Allied, 131 to 117; American Cyanamid, 65¼ to 57¼; Dow, 92⅝ to 83¾; Du Pont, 274¾ to 261; Monsanto, 56¾ to 49; Olin Mathieson, 58⅜ to 49⅛; and Union Carbide, 150½ to 140¼. But all of these issues were quick on the rebound, regaining 1 to 5 points within the next 24 hours.

Rumors that the steel strike will be settled within a week or so were fading at weekend, following the federal mediator's report that both management and union negotiators still showed no inclination to give ground, regardless of Labor Secretary Mitchell's public fact-finding.

Right now, CPI management is trying to figure (1) how to keep sales volume on a high plane while the steel strike continues, (2) how to participate fully in the new business spurt that's expected right after the steel, copper and aluminum settlements. One instance: Air Products, Inc.—which late last week speedily sold more than $5 million worth of new common stock at $46/share (next day's trading was at 46½ to 47½)—affirms that the steel strike will have "some adverse effect on earnings." If it lasts beyond Sept. 30, "such effect might be material."

•

And the steel strike will pinch sulfur companies' sales and earnings. But last week, two Mexican sulfur producers were optimistic:

• Pan American Sulphur says second-quarter earnings were up 62.5%, to $1.3 million; its liquid sulfur terminal at Tampa, Fla., has gone into operation; and its dry-bulk facility—also at Tampa—will be constructed "immediately."

• Texas International Sulphur apparently will not have to go through a costly proxy fight and possible take-over (*CW, Aug. 15, p. 24*). At the annual meeting last week in Houston, Tex., the management slate was elected with 2.8 million votes (out of 3.56 million shares outstanding); no votes were cast in opposition. A minority faction threatens to fight in court for control of the company, but it's doubtful that this group holds enough stock to make much headway. Company President W. Eugene Stack told *CW* that TIS has stockpiled about 8,000 tons of sulfur at its Mexican mines and expects to begin sales and make first shipments when the canal to connect the plant with the Gulf is completed—probably in October.

•

In the face of growing competition from abroad, U.S. chemical companies are planning oral defenses against tariff cuts now being con-

sidered on several chemical products. To "atone" for recent tariff hikes on safety pins, thermometers and spring clothespins, the Interdepartmental Committee on Trade Agreements has proposed "possible modification" of duties and other import restrictions on products from golf balls to live birds. Public hearings will be held in October.

Chemical products to be affected: fatty alcohols, sulfated fatty acids, dicalcium phosphate, fused quartz or fused silica, inks and ink powders.

Where chemicals have been concerned, "modification" usually means "reduction," according to a spokesman for Synthetic Organic Chemical Manufacturers Assn., and duties are "already too low to protect U.S. interests." Also, the industry suspects this is but a first listing—with additional chemicals eventually to appear on the docket.

As usual, the industry will take a "product by product" approach. But SOCMA feels that only a few chemicals can stand tariff reductions.

•

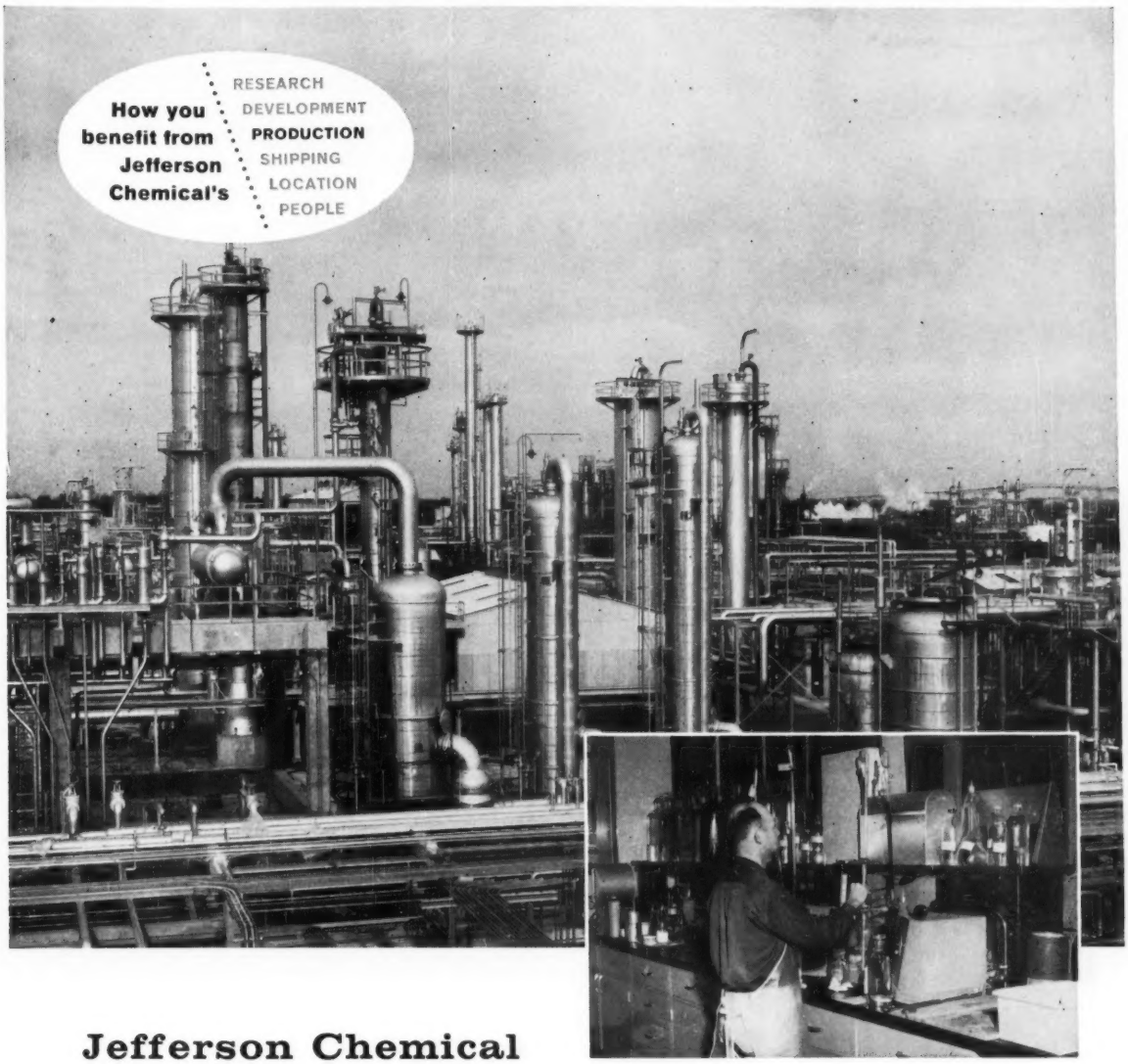
Kaiser Aluminum & Chemical will broaden its overseas interests by investing in India's biggest aluminum plant—a $30-million, 20,000-metric tons/year integrated complex, which will include bauxite and alumina facilities. It will also be the largest single U.S. investment with an Indian partner. Kaiser will build the plant and will hold a 27% interest in the new company, Hindustan Aluminium Corp., Ltd. A leading Indian industrialist, G. D. Birla, and the "general investing Indian public" will own the rest. Operations are due to start by '62. Indian's aluminum needs are expected to reach 30,000 tons/year by '60-'61, of which present producers are able to supply only 20,000 tons/year.

•

Two significant expansion projects have the go-ahead signal:

• Continental Oil will construct a multimillion-dollar petrochemical plant at Lake Charles, La.—where the company already operates a refinery and petroleum coking unit. Lake Charles is also the location of major petrochemical and carbon black operations in which Conoco holds part ownership. The new plant will manufacture a line of straight-chain alcohols, now produced from nonpetroleum oils and fats. Processing know-how—based on earlier work done by Germany's Prof. Karl Ziegler—was developed by Conoco's research scientists at Ponca City, Okla., over the past five years. Conoco has a Ziegler license. The plant will have a 50-million-lbs./year capacity, and will be built by Lummus Co. (Houston). Expected completion: early '61.

• And Stauffer Chemical is starting construction of an aluminum sulfate plant adjacent to the company's sulfuric acid plant at Vernon, Calif. (near San Francisco). The new unit—with initial capacity set for 1,000 tons/month of liquid alum—will be completed late this year. It'll be Stauffer's sixth alum plant in the U.S.



Jefferson Chemical doubles production . . . redoubles service!

Jefferson has now completed a two-year expansion program at the Port Neches, Texas, Plant.

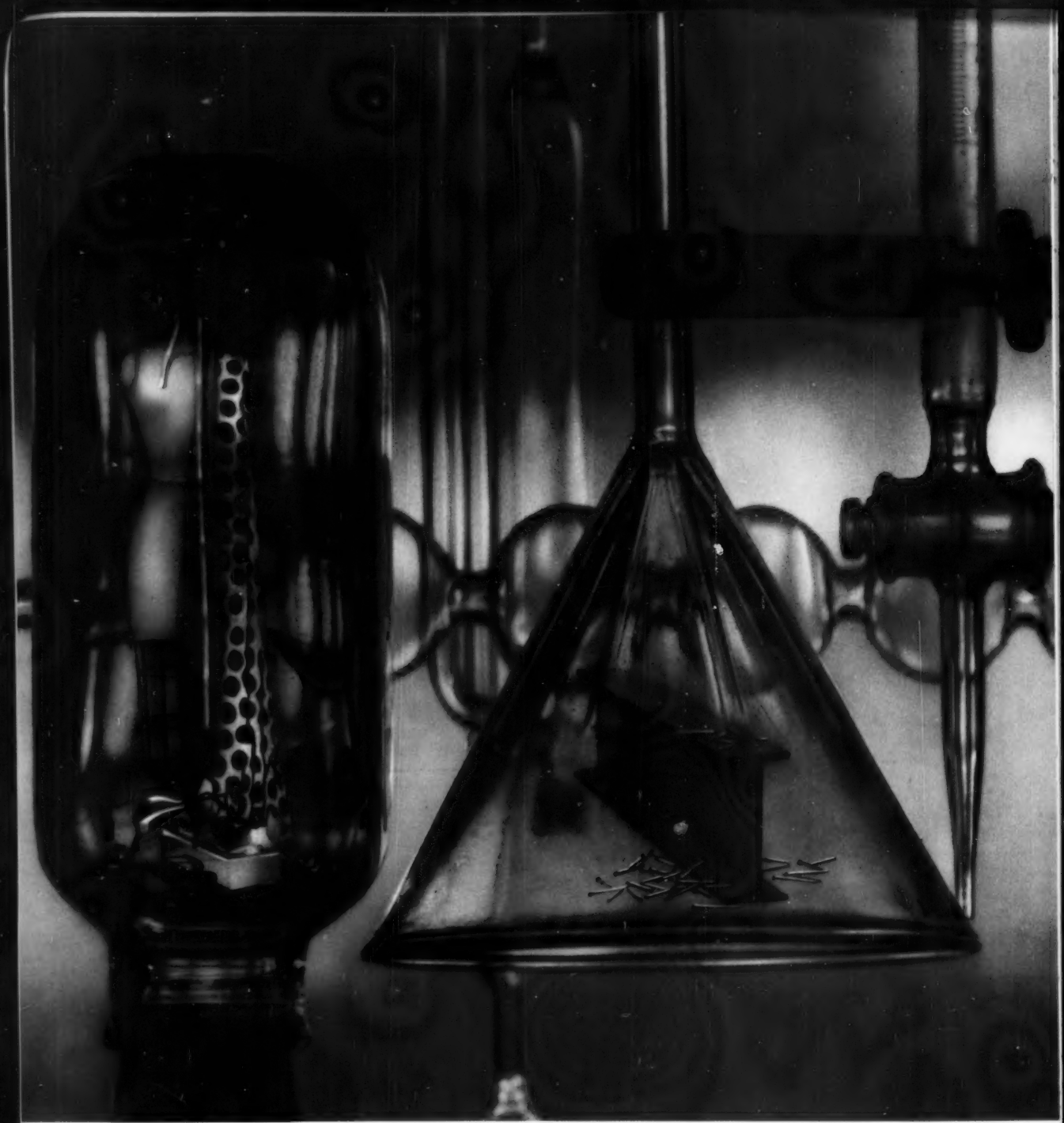
New plants now on stream triple Jefferson's ethylene capacity, double glycol capacity and increase ethylene oxide production by 50 per cent. Significant increases have been made in the production of ethanolamines, SURFONIC® surface-active agents, polyethylene glycols, and piperazine. A newly constructed chlor-alkali plant adds 60,000 tons/year of caustic soda capacity. Scheduled for early summer production are propylene oxide and propylene glycol. This all adds up to a dependable supply source for some 1000 tons/day of essential organic and inorganic chemicals.

But of equal importance to you is Jefferson's expanded plant laboratory which carefully monitors and verifies product quality . . . endeavoring at all times to exceed your specifications for purity, color, and performance properties. These chemists work closely with Jefferson's Austin Research Laboratories and growing technical service staff in promptly supplying you with the right answers . . . the right products for your special requirements.

JEFFERSON CHEMICAL COMPANY, INC.

HOUSTON • NEW YORK • CHICAGO • CLEVELAND • CHARLOTTE • LOS ANGELES

124



COLUMBIA-SOUTHERN CHEMICALS ANSWER

LOWER COSTS, BETTER PROFITS . . . however you analyze it, dollars saved in processing show up clearly on the balance sheet. That's the big reason you look so closely at the total "package" you get when you buy such essential materials as chemicals.

Product purity? Meeting or exceeding your tightest specifications, shipment after shipment. Dependability of supply? Delivery from plants or terminals meshed exactly to your schedules. Geared to your handling and use? Widest range of forms, concentrations, land or water shipment. And vitally important . . . ideas and technical help? Instantly available through every district office, or direct from Pittsburgh: experienced, practical specialists with a keen eye to the economics of your specific operation. All this, from whom? Why, of course:

Columbia-Southern Chemical Corporation, One Gateway Center, Pittsburgh 22, Pennsylvania. Offices in fourteen principal cities. In Canada: Standard Chemical Limited.

DOLLAR-DRAINING PROCESSING PROBLEMS

CAUSTIC SODA and its voracious appetite work thriftily to produce textiles, packaging films, petroleum products, innumerable goods.

CHLORINATED SOLVENTS are used in such divergent operations as degreasing metal products and dry cleaning delicate gowns.

SODA ASH is indispensable to the manufacture of glass, soaps and detergents, metals, pigments, other chemicals.

CHLORINE regroups molecules for economical processing of paper products, solvents, plastics, wonder drugs, hundreds of products.

COLUMBIA-SOUTHERN CHEMICAL CORPORATION

A Subsidiary of Pittsburgh Plate Glass Company

Anhydrous Ammonia, Barium Chemicals, Benzene Hexachloride, Calcium Chloride, Calcium Hypochlorite (Pittchlor®, Pittabs®), Carbon Tetrachloride, Caustic Potash, Caustic Soda, Chlorine, Chlorinated Benzenes, Chloro-IPC, Chrome Chemicals, Hydrogen Peroxide, Muriatic Acid, Pacific Crystals, Perchlorethylene, Rubber Pigments (Calcene®, Hi-Sil®, Silene®), Soda Ash, Sodium Bicarbonate, Sodium Sulfate, Titanium Tetrachloride, Trichlorethylene

CS-5170-8

FLUIDICS

is a Pfaudler Permutit program providing
the know-how
the equipment
and the experience
for solving problems involving fluids

FLUIDICS covers:

water treatment	distillation
waste treatment	blending
corrosioneering	metering
fluid analysis	piping
reactions	storing
agitation	heat transfer
	centrifuging

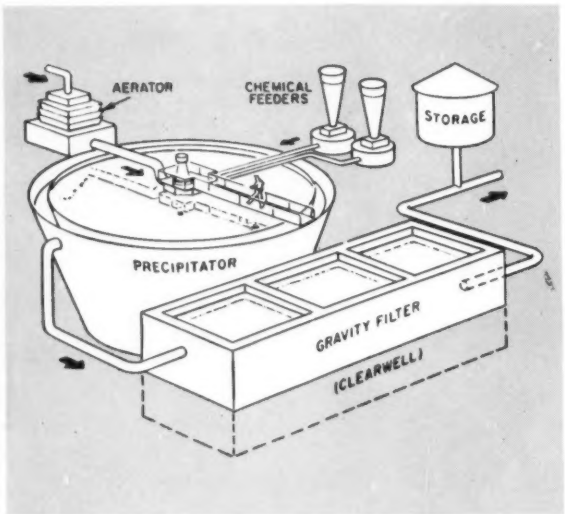
FLUIDICS AT WORK

Selecting water treatment systems to meet your specific needs

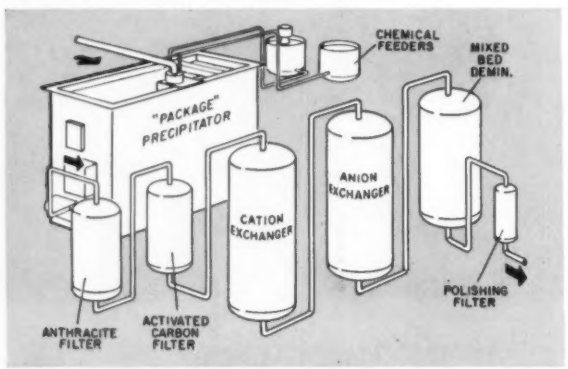
Many factors are involved in proper selection of water treatment equipment for specific use. Analysis of the raw water, volume and quality of water required, cost of equipment (both initial and operating), amortization rates and plans for future expansion, to cite just a few. The systems illustrated typify answers to widely varying requirements.

If you are concerned with any phase of water conditioning, bring an outline of your requirements to Permutit. As the largest and most experienced producer of water treatment equipment of every type, Permutit can assure you sound recommendations and the most efficient and economical system available for your particular need.

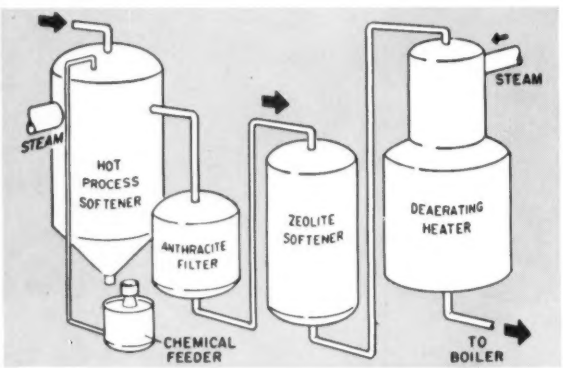
Write to the Permutit Division, Dept. CW-89, 50 West 44th Street, New York 36, New York . . . or Permutit Company of Canada Ltd., Toronto 1, Ontario.



Well water for municipal supply. Aerator reduces CO_2 to lower acidity, reduces taste and odor and oxidizes dissolved iron and manganese. Precipitator removes turbidity, color, hardness and oxidized iron and manganese. Gravity filters remove remaining traces of turbidity.



Process water for electronic components. Package Precipitator removes bulk of turbidity, hardness and iron. Anthracite filter removes remaining suspended matter. Activated carbon filter takes out color and absorbs dissolved organics. Demineralizer—cation, anion, and mixed bed — reduces dissolved solids to guaranteed maximum. Polishing filter removes traces of suspended matter.



Water for steam boiler. Hot process softener reduces hardness to a few grains per gallon. Also reduces silica. Anthracite filter removes remaining turbidity. Zeolite softener may be added to system where zero hardness is needed. Finally, the deaerating heater removes oxygen to prevent corrosion.

PFAUDLER PERMUTIT INC.

SPECIALISTS IN FLUIDICS . . . THE SCIENCE OF FLUID PROCESSES

Scientifically Designed Fruehaufs Haul Many Hot Commodities!

Insulated Fruehauf Units Are Profitably At Work Hauling Dairy Wax, Edible Oils, Styrene, Animal Fats, Plasticizers, Caprolactum, And Countless Other Liquids!

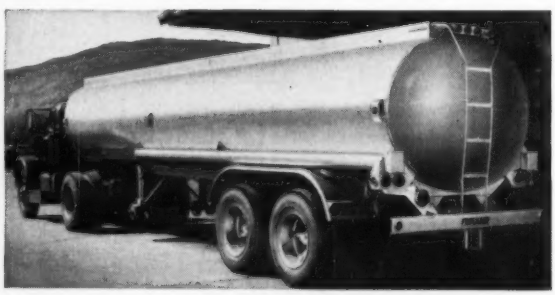
Aluminum, steel, and stainless steel Fruehaufs are designed with special insulation and heating equipment for shipping liquids like those mentioned here at constant temperatures anywhere in the 150° range. Other units hold in-transit temperatures as high as 450°.

Liquid wax, being loaded in the photograph right, is among the many products of this type which are safety transported via Fruehauf Tanks. Soy bean oil, liquid shortening, phenol, glacial acetic acid, and many other commodities can be profitably handled.

Fruehauf precision manufacturing, which includes *automatic* welding of tank seams, produces units of the highest quality and safety. Consult Fruehauf first for *dry* bulk transports too.

ALUMINUM—Leaman Transportation Corp., an affiliate of Chemical Tank Lines, Inc., Downingtown, Pa., hauls liquid wax in this heated, insulated, conically shaped, clean bore aluminum unit. Leaman and affiliates operate in 34 states and Canada, hauling over one billion gallons of liquids annually.

STAINLESS



STEEL

FRUEHAUF TRAILERS

For Forty-Five Years—More Fruehauf Trailers On The Road Than Any Other Make!

World's Largest Builder of Truck-Trailers

FRUEHAUF TRAILER COMPANY

10948 Harper Avenue • Detroit 32, Michigan

Please send complete information on the type of Fruehauf Hot Commodity Transports checked: ☐ **Aluminum** ☐ **Steel** ☐ **Stainless**

☐ **Tanks for the following liquids**_____

NAME_____

COMPANY_____

ADDRESS_____

CITY_____ ZONE____ STATE_____

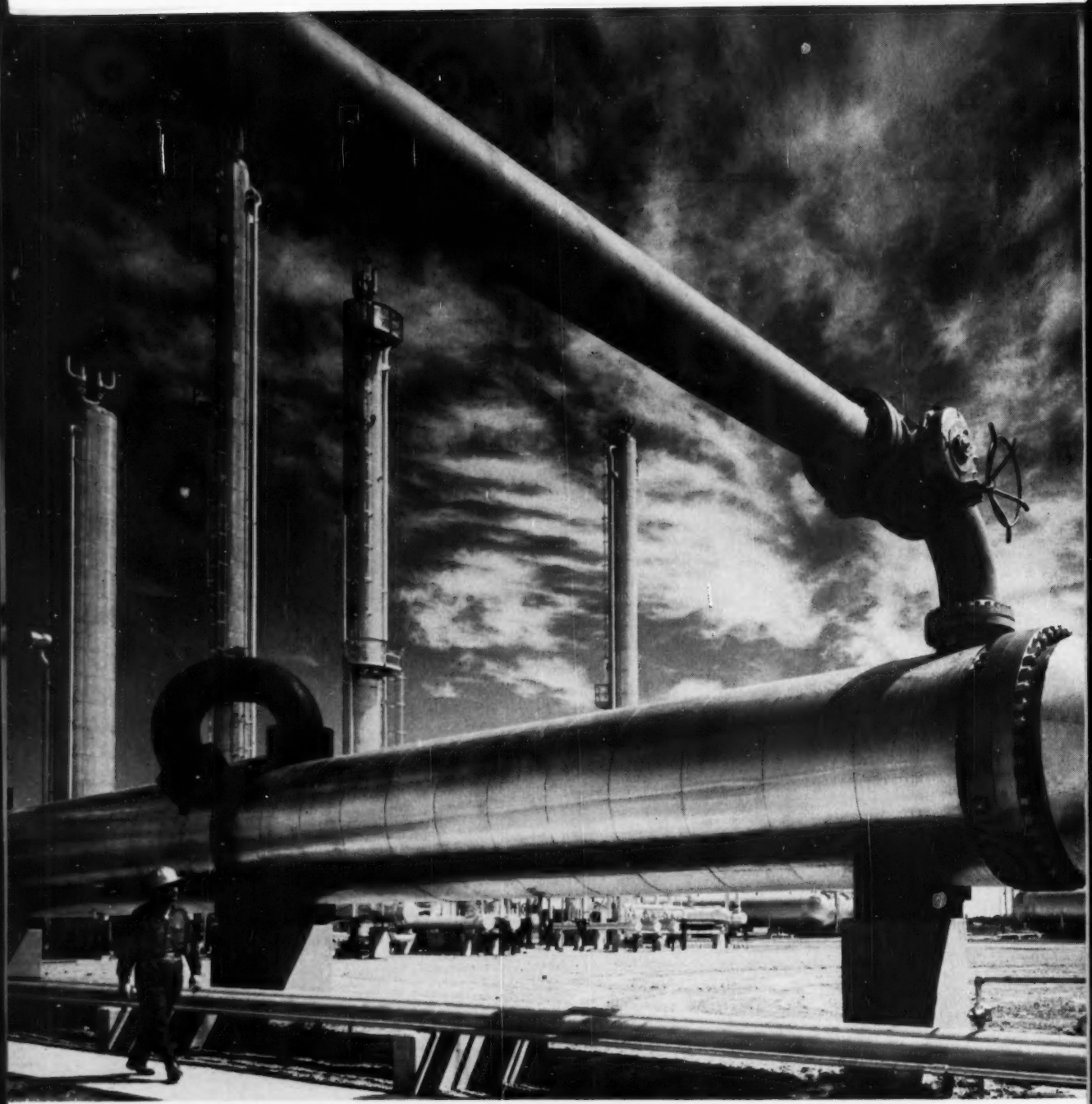
Polyester resins made with **Oronite Isophthalic** *perform better!*

Consider the many advantages isophthalic polyester resins offer you—greater physical strength, greater retention of strength under and after stress, better durability on exposure to time, water and weather. These performance improvements have been demonstrated time and time again in end products such as boats, automotive bodies and cabs, pipe, luggage, business machine housings and many others.

Ask Oronite for isophthalic polyester resin formulations and samples. Possibly Oronite has a formulation that will perform better in the products you market or intend to market.

ORONITE CHEMICAL COMPANY
A CALIFORNIA CHEMICAL COMPANY SUBSIDIARY
EXECUTIVE OFFICES • 200 Bush Street, San Francisco 20, California
SALES OFFICES • New York, Boston, Wilmington, Chicago, Cincinnati, Cleveland, Houston, Tulsa, Los Angeles, San Francisco, Seattle
Foreign Affiliate: California Chemical International, Inc., San Francisco, Geneva, Panama

6230



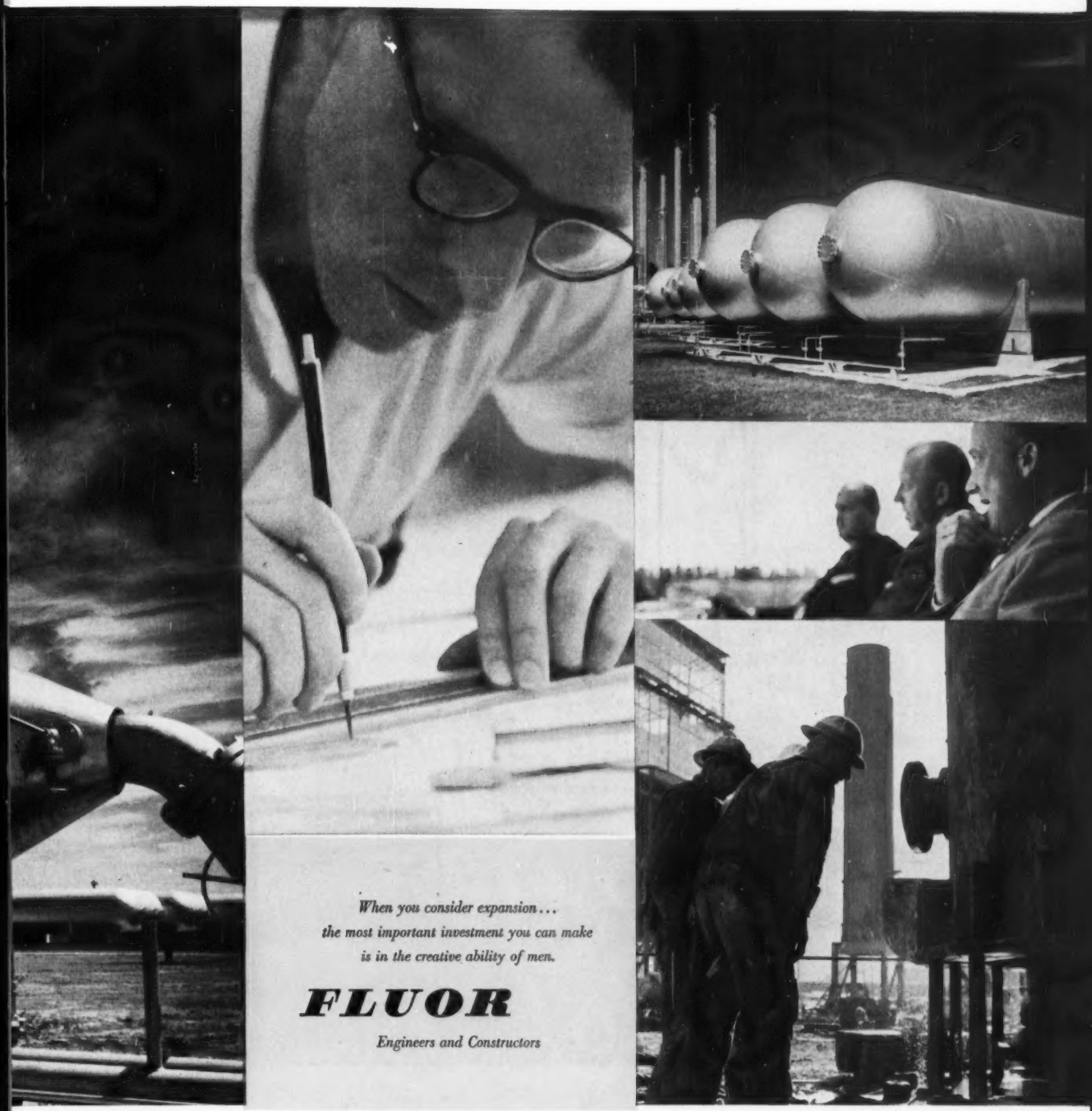
The extraction plant of Runnels Gas Products Corporation at Eunice, La., processes more than 300 mmcf. of pipeline gas daily to yield 5,000 barrels of liquid hydrocarbons (all the natural gasoline and butanes, 96% of the propane and 35% of the ethane.) Fuel-gas consumption is less than 3%. Absorption takes place at -40°F.

What's new in gas processing?

Anyone contemplating construction of a natural-gas processing plant, whether its purpose is treating, extraction or a combination of both, must first solve a puzzle with three complex variables. The efficiency and profitability of the plant depend on how well the puzzle is solved.

The first variable is, of course, the volume and composition of the inlet gas stream. The second is the market, if any, for extracted products, and the third is the legal and technical requirements for residue gas.

Major shifts in these variables make it profitable today to design gas-processing plants that differ radically from those built only a few years ago, and to locate them much farther away from the gas fields.



When you consider expansion...
the most important investment you can make
is in the creative ability of men.

FLUOR

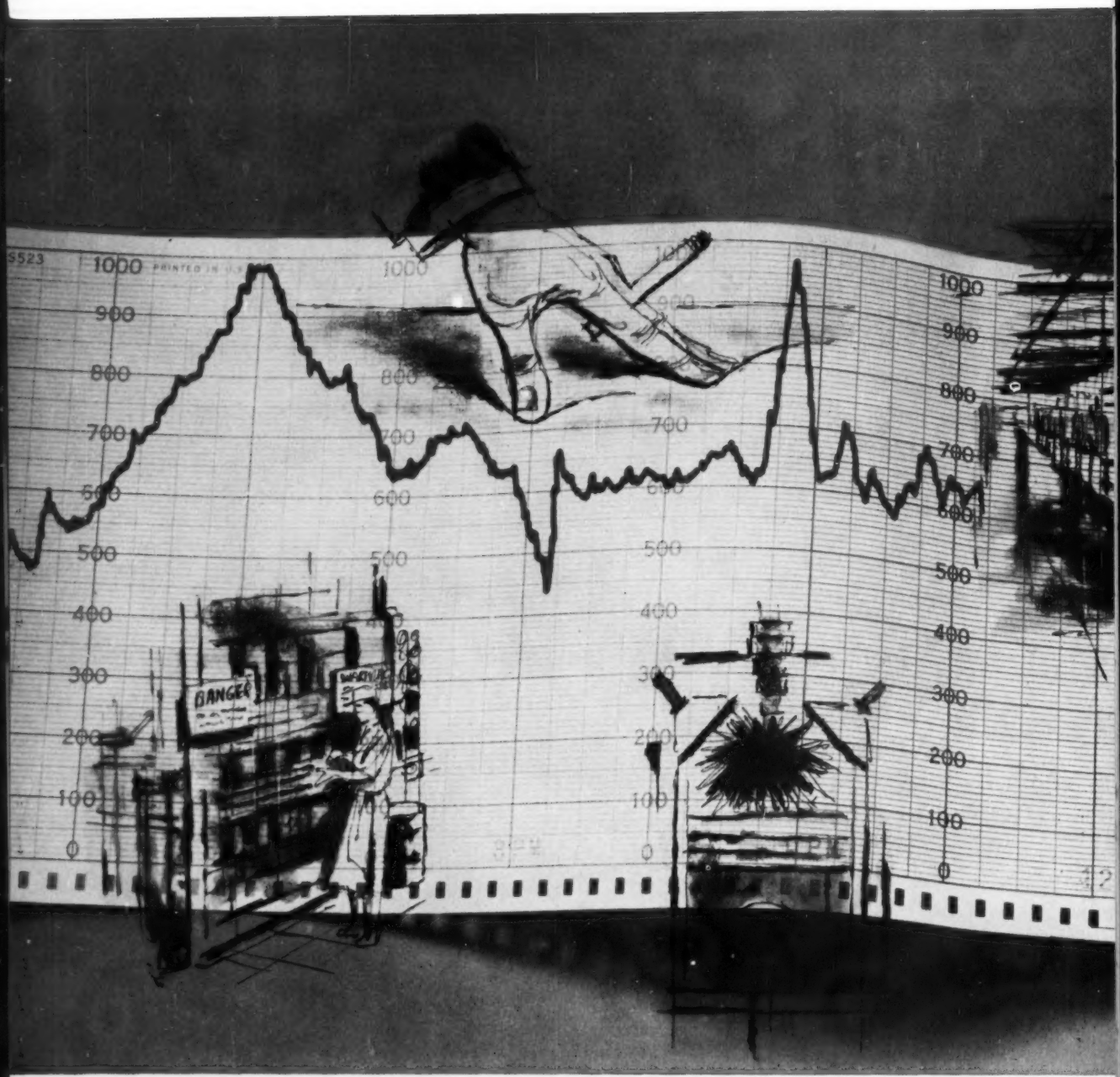
Engineers and Constructors

For example, it is now advantageous to build large, highly efficient extraction plants to handle great volumes of lean Louisiana gas. Such plants serve the tremendously expanded LPG market for butanes and propane, and the petrochemical market for both of these, plus ethane. Because of the volume of gas, and the degree of extraction desired, a combination of extreme cold and light-oil absorption is the most efficient way to get the marketable hydrocarbons out. Refrigeration costs are more than offset by the use of smaller quantities of lighter oil, with consequent savings in pumping and stripping capacity.

As the natural-gas industry mushrooms, the trend is toward large plants, not only for hydrocarbon extraction but for sour-gas treating as well. And as the plants grow bigger, new levels of efficiency can be reached through methods that were impractical in smaller installations.

The development of new techniques for large-volume gas processing has been a Fluor contribution to the industry. The combined experience of the gas specialists in Fluor's Los Angeles and Midcontinent divisions represents a pool of advanced know-how that is unequaled anywhere.

The Fluor brochure, "Opportunities in Gas Processing," will be helpful to anyone planning construction of a processing facility. Write to Dept. 43, The Fluor Corporation, Ltd., 2500 South Atlantic Boulevard, Los Angeles 22, California,



To tame heat and

Does heat or flame present a hazard in your business or product, or set a limit to the efficiency of equipment? If so, Celanese has some chemical answers for you:

We have developed—and produce—fire-resistant synthetic lubricants and hydraulic fluids, fire resistant plasticizers, fire-retardant additives for paints and varnishes, motor fuel additives that improve combustion, and heat-resistant lubricants for high temperature applications. These products are typical examples of the contribution of Celanese to safety and progress in American industry. Take advantage of our long experience in reducing the hazards and losses of heat, fire and explosion. If you have such a problem, why not ask us to help? Write Celanese Corporation of America, Chemical Division, Dept. 752-H, 180 Madison Ave., New York 16.

Celanese® Celluflex® Cellulube® Cellutherm™

tion but for sour-gas treating as well. And as the plants

22, California,

CHEMICAL 'COOK' ELIMINATES PROCESSING FAILURES

The danger of direct fire and the enormous pressures of steam have made high temperature processing by either of these methods uncertain . . . often times unsafe. Dowtherm® A, organic heat-transfer medium, keeps a steady hand on high temperature control, while reducing fire hazard and cutting pressures to as much as one-thirtieth that of steam.

The automatic electric frying pan may have made the "processing" of such a thing as a fried egg practically foolproof. But in industrial high temperature processing, heat control still is a problem in many plants where pinpoint accuracy is vital to the uniform quality of the finished product.

From potato chips to automobile parts, these products have traditionally been processed using direct fire or steam. Each system has had inherent drawbacks, . . . the potential hazard of fire or the high cost of equipment to handle steam at high pressures. And neither has been notably satisfactory in making it easy to keep temperature gauges from wavering.

Safe, steady heat is now a reality, however, with the use of Dowtherm A as a vapor phase heat-transfer medium. This "thermostat" chemical is highly stable, permitting processors to maintain temperatures with fraction-of-a-degree accuracy between 350°F. and 750°F. And this accurate heat can be supplied to several processing units at different temperatures if desired. Be-

Equipment for the use of Dowtherm A often pays for itself in three to five years through reduced costs and improved production.

Export Sales: Amcel Co., Inc., and Pan Amcel Co., Inc., 180 Madison Ave., New York 16, N. Y.

cause the heat source for systems using Dowtherm A can be located at a safe distance from the actual processing operation, the danger of fire is greatly reduced.

Contrasted to the heavy, high cost equipment necessary to contain 700° steam under more than 3,000 pounds pressure, Dowtherm A at the same temperature takes light handling because it exerts only 110 pounds pressure per square inch.

The singular attraction of Dowtherm A as an unequaled medium for precision heat transfer has led hundreds of processors to install new or modified equipment to handle the chemical. But then other dividends accrued, too. These processors have found that systems using Dowtherm A were actually self-liquidating in three to five years time through reduced insurance rates, decreased operating and maintenance costs, improved production.

Dowtherm A has been used for more than 10 years with outstanding success to mold plastics and rubber products, distill fatty acids, process paints and varnishes, manufacture linoleum and in a wide variety of other applications in food processing, chemical processing and metal plating.

Special Dowtherm products now have been developed for profitable new uses. Examples are Dowtherm SR-1 for subsurface snow removal systems and Dowtherm 209, a freeze point depressant for ebullient cooling.

★ ★ ★ ★

If you aren't already profiting from these and other Dow chemicals, we suggest you write for complete information to THE DOW CHEMICAL COMPANY, Midland, Michigan, Chemicals Merchandising Department 919AM8-29.

METHOCEL:

These gums stretch over widest viscosity range

Versatile, synthetic gums are expanding into new areas of textiles, paper, food and paint manufacture. And a big reason for this expansion has been the wide usefulness of Dow's family of synthetic gums with the widest viscosity range . . . the Methocel® products.

60-page Methocel Book describes properties and uses of versatile synthetic gums.

With available viscosities ranging from 10 cps. to 15,000 cps., Methocel gums have shown exceptional capabilities as thickeners, stabilizers, film formers, emulsifiers, suspending agents and binders.

These water-soluble, nonionic gums have a profitable performance record in improving products and processes . . . from basic viscosity control to conquering such complex problems as suspension polymerization. It takes no stretch of the imagination to discover their potential usefulness in your business. A close look at the most recent 60-page book on Methocel products will show you.

One-stop shopping for POLYOLS

In the colossus of the modern department store, you'll see occasionally a sign which says something to the effect, "If you can't find what you're looking for . . . just ask for it".

The chemist or processor looking for the right polyols for his own particular application will find the same assurance of supply in the Dow inventory of these basic chemicals, accurately labeled "world's widest line of polyols".

This amounts to more than just purchasing convenience, however. It means the men at Dow have much to offer the polyol user, too, in the way of technical service, research information and new polyol products for experimental use as intermediates, plasticizers, emulsifiers, lubricants, antifoamers, coolants, solvents and other products.

DOW CHEMICALS basic to the chemical processing industry

Alkylene Oxides, Glycols
Industrial Preservatives • Glycol Ethers
Polyalkylene Glycols • Alkalies
Phenolic Compounds • Brominated and Chlorinated Aliphatic Compounds
Inorganic Acids • Halogens
Organic Acids and Esters
Inorganic Chlorides, Bromides and Bromates • Nitrogen Compounds
Amino Acids • Glycerine • Salicylates
Phenyl Phosphates • Chelating Agents
Flotation and Flocculating Agents
Heat-Transfer Media • Methylcellulose
Ion Exchange Resins • Magnesium
Plastics • Aromatics

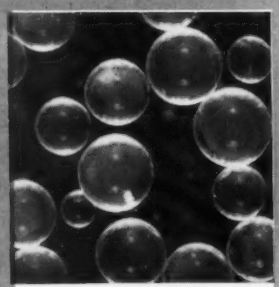
THE DOW CHEMICAL COMPANY
Midland, Michigan

DOW

DOW CHEMICALS . . . well worth noting

PHARMACEUTICALS
Dow supplies imposing list of pure, high quality pharmaceutical chemicals such as bromine, medicinal salicylates, epsom salt, chloroform, analgesic drugs, elemental iodine.

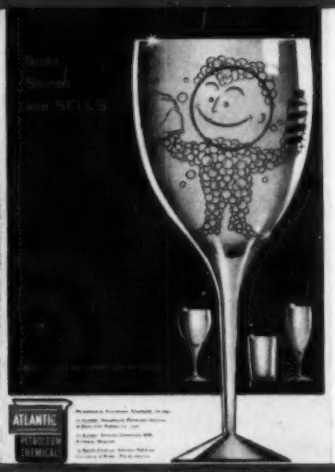
PENTACHLOROPHENOL
New 12 page booklet—"Low-Cost Pole Buildings for Industry"—describes in detail low costs and long lasting benefits of penta-treated pole buildings. Write for copy today!



ION EXCHANGE RESINS
Dowex® 50W, white cation resin with excellent bead strength and uniformity, is newest member of Dowex products for many industrial processing applications.

BROMINE
Most grades of bromine and brominated products are available from Dow where nearly 70 years of leadership in research, know-how and production are at your disposal.

ATLANTIC PET



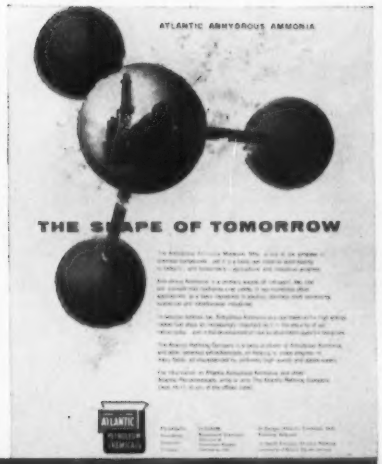
A FAMILY OF QU

Atlantic Petrochemicals: Five major product lines—ULTRAWETS, TECHNICAL EICOSANE, OLEFINS, ANHYDROUS AMMONIA and DETERGENT ALKYLATES—perform literally hundreds of important jobs in vital industries at home and abroad.

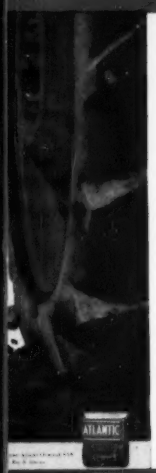
The applications featured above are only a *few* of the numerous *existing* uses of this versatile chemical family.

Atlantic Petrochemicals are widely known for their high quality and consistent uniformity at economical costs. The use of these petrochemicals as raw materials for further processing or ingredients in product formulations assures you of building these same advantages into the products you market.

Name a leader and you find a user of Atlantic Petrochemicals



ROCHEMICALS:



ALITY PRODUCTS

For complete information on how these quality products can help in *your* operation, write or wire Chemicals Division, The Atlantic Refining Company, 260 South Broad Street, Philadelphia 1, Penna.

ATLANTIC
PETROLEUM
CHEMICALS

LOOK TO ATLANTIC FOR QUALITY

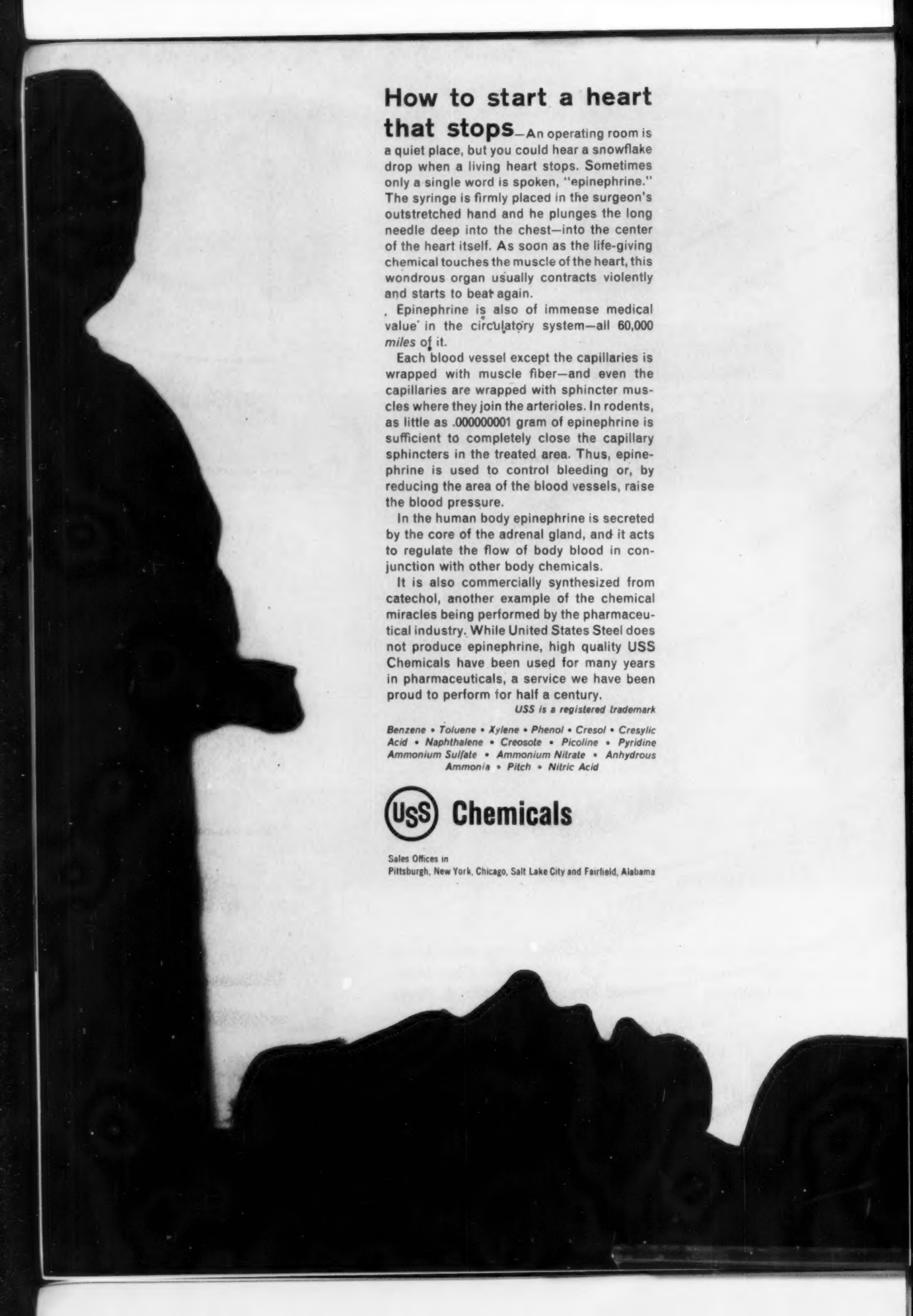
PHILADELPHIA · PROVIDENCE · CHARLOTTE
CHICAGO · LOS ANGELES

In Canada: Naugatuck Chemicals, Division of Dominion Rubber Company, Ltd.

In Europe: Atlantic Chemicals SAB, Antwerp, Belgium

In South America: Atlantic Refining Company of Brazil, Rio de Janeiro

ULTRAWET 35KX
cuts formulation costs in cotton scouring, wool scouring, soaping-off and dye leveling compounds



How to start a heart that stops

—An operating room is a quiet place, but you could hear a snowflake drop when a living heart stops. Sometimes only a single word is spoken, "epinephrine." The syringe is firmly placed in the surgeon's outstretched hand and he plunges the long needle deep into the chest—into the center of the heart itself. As soon as the life-giving chemical touches the muscle of the heart, this wondrous organ usually contracts violently and starts to beat again.

Epinephrine is also of immense medical value in the circulatory system—all 60,000 *miles* of it.

Each blood vessel except the capillaries is wrapped with muscle fiber—and even the capillaries are wrapped with sphincter muscles where they join the arterioles. In rodents, as little as .000000001 gram of epinephrine is sufficient to completely close the capillary sphincters in the treated area. Thus, epinephrine is used to control bleeding or, by reducing the area of the blood vessels, raise the blood pressure.

In the human body epinephrine is secreted by the core of the adrenal gland, and it acts to regulate the flow of body blood in conjunction with other body chemicals.

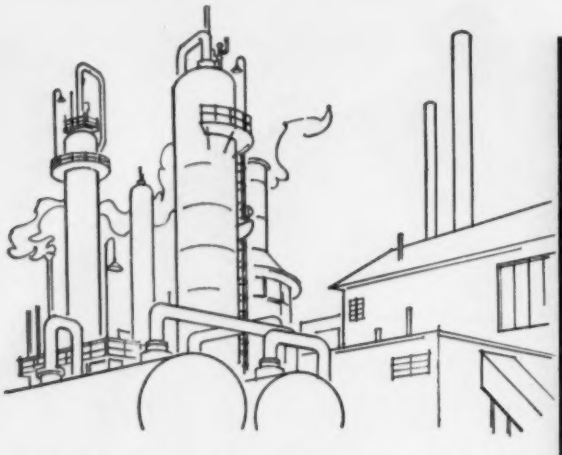
It is also commercially synthesized from catechol, another example of the chemical miracles being performed by the pharmaceutical industry. While United States Steel does not produce epinephrine, high quality USS Chemicals have been used for many years in pharmaceuticals, a service we have been proud to perform for half a century.

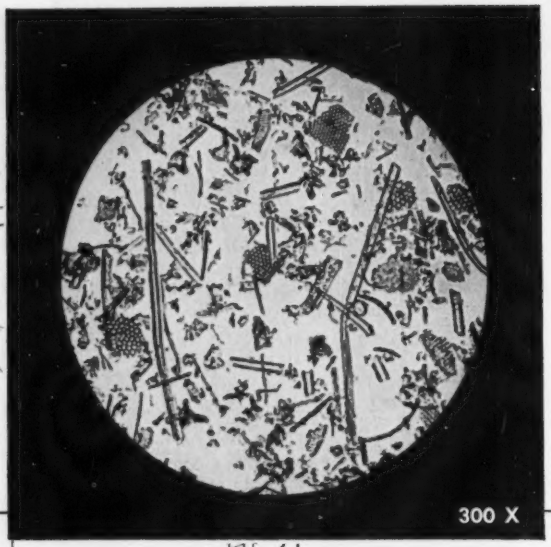
USS is a registered trademark

Benzene • Toluene • Xylene • Phenol • Cresol • Cresylic Acid • Naphthalene • Creosote • Picoline • Pyridine Ammonium Sulfate • Ammonium Nitrate • Anhydrous Ammonia • Pitch • Nitric Acid

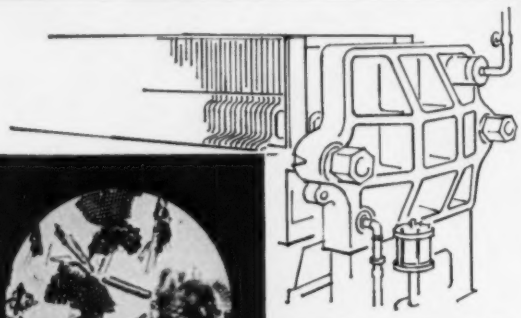
USS **Chemicals**

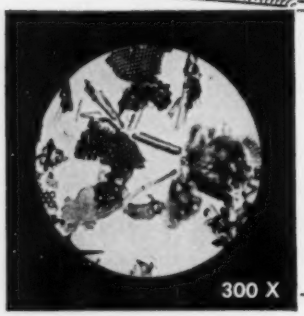
Sales Offices in
Pittsburgh, New York, Chicago, Salt Lake City and Fairfield, Alabama



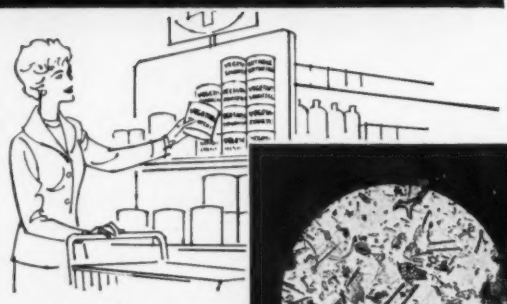


For flow rate plus clarity—Hyflo Super-Cel has the right combination of large and fine particles. Heavily used in chemical processes such as caustic soda production.

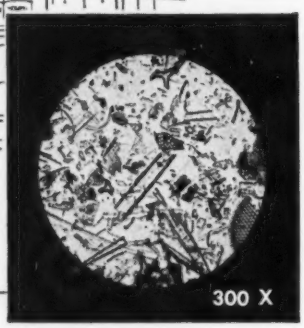




For fast flow rates—Celite 545 has a higher proportion of coarse particles. Frequently used for clarification of resins and other viscous liquids.



For maximum clarity—Filter-Cel has a relatively fine particle size distribution. Used in producing lard, salad oil, other hydrogenated oil products.



In diatomites, Johns-Manville precision processing works for you

Celite has the exact grade for every filtration need from fast flow rate to maximum clarity

Study samples of various filtration grades of Celite* diatomite with the unaided eye. Rub them between your fingers. One grade looks, feels very much like another.

Then compare these grades under the microscope. Each has its own distinctive particle size distribution. Each is precision-milled to fill the most exacting filtration requirements, ranging all the way from maximum flow rate to maximum clarity.

Celite 545, for example, with a higher proportion of large to fine particles, is used to remove large suspended impurities at maximum flow rates. *Hyflo Super-Cel®* has a balanced particle size distribution, combines good liquid clarity and moderate flow rate. But *Filter-Cel®* has a much higher ratio of small particles, is tailored for use where high clarity outweighs flow rate.

Whatever your filtration problem—Johns-Manville can furnish the "right" grade for the job. You have a choice of 9 intermediate grades *plus* many special grades. Each comes from the largest and purest commercially available deposit. Each is processed and graded at the same plant under the same uniform conditions.

For information on specific filtration or mineral filler problems, talk to your nearby Celite engineer, or write to us. Johns-Manville, Box 14, N. Y. 16, N. Y. In Canada, Port Credit, Ont.

*Celite is Johns-Manville's registered trademark for its diatomaceous silica products

JOHNS-MANVILLE

DOW | CHEMICALS

Announcing Dow's newest producing point for propylene oxide, propylene glycol, propylene glycol USP and derivatives . . . on stream at

PLAQUEMINE

Because of the ever-increasing industrial utilization of propylene oxide and propylene oxide derivatives, Dow has added PO production facilities at Plaquemine, Louisiana, to its producing points at Midland, Michigan, and Freeport, Texas. These plants, along with Dow's three major bulk terminals in New York, Chicago and Los Angeles, comprise the most complete propylene glycol and PO production and distribution network in the nation. Continuous abundant supplies of high quality PO and its derivatives . . . readily available . . . assure prompt delivery.

An additional benefit customers derive from Dow's many years of experience with propylene products: utmost protection given to shipments. Drums lined with epoxy resins are used to prevent iron pick-up and guard against contamination. And aluminum tank cars protect the purity of bulk shipments.

Most important, whether your propylene product order is filled at Freeport, Midland or Plaquemine, you can be sure of superior quality, and rigid adherence to specifications . . . distinguishing trademarks of all Dow chemical products.

The Dow team of scientists, engineers, production and marketing specialists—all highly experienced in propylene oxide and its derivatives—is at your service. Call the Dow sales office in your area, or write THE DOW CHEMICAL COMPANY, Midland, Michigan, Chemicals Merchandising Department 1107AM8-29:

THE DOW CHEMICAL COMPANY • MIDLAND, MICHIGAN

Chemical Week — August 29, 1959

House, Senate bills . . . spark conflict over probable law.

86TH CONGRESS 1ST SESSION **S. 1555**

IN THE SENATE OF THE UNITED STATES

APRIL 25, 1959
Ordered to be printed as passed

AN ACT

To provide for the reporting and disclosure of certain financial transactions and administrative practices of labor organizations and employers, to prevent abuses in the administration of trusteeships by labor organizations, to provide standards with respect to the election of officers of labor organizations, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That this Act may be cited as the "Labor-Management Reporting and Disclosure Act of 1959".

DECLARATION OF FINDINGS, PURPOSES, AND POLICY

SEC. 2. (a) The Congress finds that, in the public interest, it continues to be the responsibility of the Federal

1—O

86TH CONGRESS 1ST SESSION **H. R. 8342**

IN THE HOUSE OF REPRESENTATIVES

JULY 28, 1959

A BILL

To provide for the reporting and disclosure of certain financial transactions and administrative practices of labor organizations and employers, to prevent abuses in the administration of trusteeships by labor organizations, to provide standards with respect to the election of officers of labor organizations, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

TABLE OF CONTENTS

1

'HARSH, ANTILABOR,' says AFL-CIO's George Meany.

WIDE WORLD PHOTOS

'DOESN'T GO FAR ENOUGH,' says C of C's McDonnell

CPI Sees Progress in Likely Labor Law

Another era in labor-management relations—possibly comparable to the 12 years under the Wagner Act and the 12 years under the Taft-Hartley Act—appears to be opening this week. Its inauguration may come with Congressional passage of a modified version of the Landrum-Griffin bill.

For CPI management and for labor unions in the process industries, enactment of this bill would mean new ground rules—and therefore a need for new policies and practices—in labor relations.

Last week, industrial relations executives of major chemical firms had this to say about the bill shaping up in House-Senate conference:

- It would probably not affect the chemical industry differently than other manufacturing industries.
- It would probably have more direct significance for small, non-unionized plants than for large, union-organized works.
- It would probably be "a step in the right direction" to help im-

prove labor-management relations in all industries.

Thus, chemical management's views on the Landrum-Griffin bill are pretty much in harmony with those of Chairman William McDonnell of the Chamber of Commerce of the U.S., who has been supporting the bill but with some reservations. The chamber's labor relations department sees the measure as "middle-of-the-road legislation" that doesn't go far enough in proscribing certain practices—such as organizational picketing.

Objections Overruled? And on the other hand, chemical labor union leaders align themselves emphatically against the bill. They adhere to the stand taken by AFL-CIO President George Meany, who denounces the Landrum-Griffin bill as a "harsh anti-labor measure" that would "punish honest labor" without getting at the corruption and racketeering problem.

Among the chemical unions' specific objections:

- The provision to let state governments handle labor disputes passed over by the National Labor Relations Board could be used to delay and defeat representation elections.
- The "labor bill of rights" clause could force a union to grant membership to undesirable persons.
- The punitive provisions—up to $10,000 fine and two years in prison—could frighten members out of serving as unpaid, part-time officers of local unions.

No Specific Impact: On one point, at least, chemical management and labor spokesmen are in accord. They agree that no provision of the Landrum-Griffin bill would impinge on the chemical industry to any greater or lesser extent than its impact on other manufacturing industries.

As to long-range effects, chemical employers are optimistic that the bill would be of major importance in stamping out certain abuses that have been uncovered during the two years of hearings by the Senate's special labor-management relations committee headed by Sen. John McClellan (D., Ark.). And they think it "should go far to bring about better labor-management relations."

Chemical labor union leaders don't expect enactment of the Landrum-Griffin bill to bring quick disaster to their unions. But they think it would bring increasing "harassment," with a constant brake on organizing efforts and a weakening of the unions' hand in bargaining for wages and other benefits. And they strongly protest that their members already have adequate guarantees for democratic decision-making and individual rights within these unions.

Where's the Pressure? As the Landrum-Griffin proposal neared showdown this week, it appeared to be gathering strength despite the all-out opposition of such diverse union leaders as Meany, Hoffa of the Teamsters, and John L. Lewis of the United Mine Workers. Congressmen seemed to have decided that the threat of union political reprisal is less to be feared than public reaction to a failure to enact a labor reform bill this year.

This situation came as a bitter shock to the labor union forces who had taken credit for having helped elect numerous "liberal" senators and representatives regarded as friendly to organized labor. Even the AFL-CIO strategists had agreed that a labor reform bill should be adopted; but somewhere along the line, their version of an antiracketeering law was lost—and, with it, much of their anticipated influence on Congress.

What happened? This was argued at a meeting of AFL-CIO's executive board last week at Unity House, Pa. The group approved a report urging that more unions contribute to the fund for election and lobbying activities of the federation's Committee on Political Education (COPE). But no one came up with a pat explanation of the failure to stem the Landrum-Griffin tide.

Scrambling for Trona

Within the past few weeks, the plains around Green River, Wyo., have become the scene of an expensive scramble for deposits of trona (soda ash). At least four companies are prospecting in the 2,000-sq. mile area around the small (population: 3,100) lumber and mining town.

Stauffer Chemical Co. told *CW* last week that it is now spending "substantial sums" on "intensive drilling and sampling" in Sweetwater County, southwestern Wyoming. Diamond Alkali is said to be stepping up its own exploration activities of the past year, and Ruby Mining and Chemical Division of J. R. Simplot (Pocatello, Ida.) and a group of unidentified Texans are also going into action south and west of Green River.

One company, Intermountain Chemical Co. (owned 90% by Food Machinery and Chemical Corp., 10% by National Distillers & Chemical), has been producing commercial soda ash from Green River trona for almost 10 years. It has been Intermountain's recent profit record, in fact, that has helped lure the new firms to the area.

Yardstick: Demand for soda ash is high—it is a yardstick of the nation's economy (*CW, May 3, '58, p. 71*)—but prices now are so low that many companies are reluctant to make the high investment in Solvay-process units and their operation.

On the other hand, recovery of commercial-grade soda ash from trona is also an expensive proposition—substantial quantities of the trona must be available, and investment in beneficiation plants can, Stauffer estimates, run as high as $20 million. FMC's Westvaco Chlor-Alkali Division, which handles the Intermountain output, agrees, says Intermountain's initial plant cost was very high." And high freight rates limit chances of selling Wyoming soda ash in Eastern markets.

Plant Tour Turndown

The 20 Soviet chemist-tourists who wanted to see certain chemical facilities in the U.S. on their two-week visit ending this week were being treated instead mainly to ordinary sightseeing.

As of weekend, the group had not seen the inside of a single U.S. chemical plant. Some chemical companies, approached by the American Express Travel-Service for "regulation plant tours" were reluctant to open their doors to the Soviets; others said they had "too-short notice."

However, Virginia-Carolina Chemcal Co. showed the group through its fertilizer plant in Cincinnati last week, and American Express was hoping to work in a chemical plant tour in the Chicago area before the group returned to Buffalo and Niagara Falls for usual sightseeing. All other chemical plant tours at the end of the first week's visit were still "uncertain."

However, the group spent a full

day at Drexel Institute of Technology (Philadelphia) last week. Allen Bonnell, vice-president of the institute, described the guest chemists this way: "They were warm, enthusiastic and very much at home in the academic setting."

The group represented a broad spectrum—old and young, men and women.

The common denominator, Bonnell said, was not only technical terminology but also "exchange of views on the work of noted personalities in the world of chemistry today."

Bonnell said the Soviet tourists were particularly interested in the salaries paid to cooperative students while studying, and the practical application of studies (the two years a Drexel student must spend in industry as part of his predegree work). On both counts, Russian practice is similar.

On the other hand, the visiting chemists found it more difficult to grasp the American idea of sound grounding in basic chemistry prior to specialization.

Bonnell said at least 40 Russian-speaking students are on the Drexel campus this summer, but that during the day nearly all languages were spoken. Side trips with Drexel hosts were taken to Abbott Dairies' milk processing plant and laboratories, *The Evening Bulletin* and Franklin Institute.

Meanwhile, the itinerary for the rest of the two-week stay was still not complete—as far as visits to chemical firms were concerned. In the list of companies the Soviet chemists had asked to see were installations not open even to U.S. tourists, one source said. The State Dept. said it is doing "what it can," adding that, since this is not an "official delegation," the government would not pressure companies to open their doors.

New Citric Challenger

A new citric acid plant—third in the U.S.—will be in operation by next year if newly formed Bzura Chemical Co. (Keyport, N.J.) is successful in its financing move next month.

This company — an offshoot of Bzura, Inc., producer of fumaric acid and other industrial chemicals—expects to raise more than $3 million next month by:

- Selling through P. W. Brooks & Co. (New York investment house) $2.4 million in 6½% first-mortgage bonds and 240,000 shares of 25¢ par common stock; this public offering is expected to net the company somewhat more than $2.1 million.
- Borrowing $500,000 from a bank on promissory notes to be guaranteed by the parent company.
- Applying $289,000 received for common stock sold to the parent company and various individuals.
- Collecting an additional sum of up to $150,000 pledged by the parent company to assure that the new company will have initial working capital of at least $324,500.

CW PHOTO—FRANK AMELIA

Now producing fumaric acid, Bzura seeks to break into the citric lineup.

New Process Claimed: If all this goes through as planned, Bzura will proceed with construction of an 8.5-million-lbs./year citric acid plant on an 18-acre site (with existing structures) at Fieldsboro, N.J. The company says it will use a new fermentation process developed by the parent company within the past five years, based on blackstrap molasses.

Today, there are just two U.S. producers in the field. Pfizer has been the country's biggest supplier for more than 35 years; its plant at Groton, Conn., is estimated to have more than 60-million-lbs./year capacity. Miles Chemical — recently organized subsidiary of Miles Laboratories (Elkhart, Ind.)—is investing $3.6 million in increasing its citric acid capacity from 8 million to 15 million lbs./year (*CW, June 6, p. 26*). Reportedly, more than 6 million lbs. of Miles' output is for captive use, leaving 8 million lbs. or so for merchandising.

By this reckoning, Bzura figures that its new plant will represent about 10% of total U.S. capacity. And it estimates that fewer than a dozen large customers account for nearly 50% of total domestic sales, which last year were probably in the neighborhood of $15 million (not counting Miles' captive use).

Optimistic on Marketing: In a preliminary prospectus issued last week, Bzura sizes up the citric acid market like this: 60-70% of total U.S. consumption goes into soft drinks and food products; 15-20% into seltzer-type drug products and other pharmaceuticals; 10-20% into such other uses as iron sequestering agent (notably in secondary petroleum recovery, water conditioning and metal-pickling baths), cleaning agent for equipment and other metal surfaces, and intermediate for salts (such as barium citrate, used in paints) and esters (such as triethyl and tributyl citrate, used as plasticizers and foam inhibitors).

As to marketing plans, Bzura intends to go after big consumers itself and to supply smaller purchasers through distributors. It feels that "many present users of citric acid will welcome the company as an alternative source"; and says that three major distributing firms in the East and Midwest—along with others in various parts of the country—"have expressed an interest in distributing a substantial portion of the company's production."

Engineering is being handled by Singmaster & Breyer (New York). Total cost of putting the new plant into operation is estimated at $3,040,500, broken down as follows: construction, $2,491,000; interest during construction, $118,000; startup expenses, $107,000; working capital, $324,500.

After the proposed financing, which is tentatively expected the week of Sept. 14-18, there will be 1,117,000 shares of Bzura Chemical common stock outstanding out of 2 million authorized. Anticipated ownership: parent company, 53.71%; Hyman Bzura, a chemical engineer who is president and founder of both companies 9.53%; Albert Bzura, an accountant serving as treasurer of both companies, 6.41%; Irving Weiss, No. 3 investor in the parent company, 1.97%; and the public, 28.38%.

More Mergers Ahead

Still more CPI mergers are being carried out this week; but this latest trend toward acquisitions hasn't yet run its course. There's a "sellers' market" for smaller chemical companies; one industry estimate is that there are three to 10 prospective buyers for every available acquisition.

And the increasing attention being given to merger and its problems is reflected in the choice of that subject for a panel discussion at the American Institute of Chemical Engineers' Sept. 29 meeting in St. Paul, Minn.

Most spectacular of recent merger proposals: that of Stauffer Chemical Co. and Victor Chemical Works, which is likely to be consummated this fall. But more small entrepreneurs than ever before are said to be going ahead with new production projects in the hope of being snapped up by larger companies.

One CPI firm that's continuing to grow and diversify by this route: American-Marietta Co. (Chicago), which this week is completing details of its acquisition of Concrete Materials & Construction Co. (Cedar Rapids, Mich.).

Speer Carbon Co. (St. Mary's, Pa.) has purchased Electronics Division of Onondaga Pottery Co. (Syracuse, N.Y.). Onondaga Electronics produces ceramic printed circuits and, as a division of Speer, will supplement that company's present activities in the electronics field.

Meanwhile, Calaveras Cement Co. (San Francisco) and The Flintkote Co. (New York) have agreed to a merger through exchange of stock.

Industry spokesmen said there is a potential danger, however, in overemphasis on growth by acquisition—if growth from within the corporation is neglected. But for the present, companies are willing to take the risks, in exchange for profitable ventures in less time than it would take to develop projects internally.

Other recent CPI mergers:

Smith-Douglass Co. (Norfolk, Va.) will be the surviving company after merger with Smith Agricultural Chemical Co. (Columbus, O.). S-D, with annual sales of about $40 million, has 10 fertilizer and chemical plants in the Eastern half of the U.S.; Smith Agricultural has four plants in Michigan, Indiana and Ohio and annual sales of about $11 million.

In another fertilizer consolidation, International Minerals & Chemical Corp. (Skokie, Ill.) has purchased Miami Fertilizer Co. (Trebein, O.). Miami produces dry granular fertilizers in its plant near Dayton. IMC has 68 North American plants, including 25 fertilizer plants.

First Step: Century Chemical Corp. (New York)—which up to now has been in a formative stage—has consummated the first of several planned acquisitions. It has obtained more than 80% of the outstanding stock of Wilson Organic Chemicals, Inc. (Sayreville, N.J.), said to be the largest independent U.S. producer of phthalocyanine dyes and pigments. A modernization and expansion program is aimed at boosting sales from about $750,000 in '58 to more than $2 million in '60.

Studebaker-Packard Corp. (Detroit)—which earlier this year acquired Gering Products, Inc. (Kenilworth, N.J.)—is now taking over a second plastics company: C.T.L., Inc. (Cincinnati). C.T.L. is a plastics research and manufacturing organization that has specialized in problems of ultrahigh temperature in space travel. It concentrates on thermosetting resins, particularly those reinforced with glass fiber or ceramics.

Roberts Chemical Co. has been formed through merger of The Roberts Co. (Los Angeles) with Anchor Chemical Co. (El Monte, Calif., and Dayton, O.). Immediate aim is to increase production and sales of Anchor-Weld Contact Cement and other adhesive products.

Yuba Takes Over: In the field of chemical process equipment, Yuba Consolidated Industries, Inc. (San Francisco), has acquired Petro-Chem Development Co., Inc. (New York), and its U.S. and Canadian subsidiaries. Petro-Chem—producer of Iso-Flow fluid heating furnaces—had about $12-million sales volume in '58.

When stockholders of Pierce & Stevens Chemical Corp. (Buffalo, N.Y.) last fortnight approved an increase in authorized shares and a stock split, Executive Vice-President Raymond Stevens, Jr., said this would facilitate a possible acquisition in the future. He said no such transaction is being negotiated now, but that management "wants to be free to act in case something develops."

Chemical Metals Spurt

Overlapping of the chemical and nonferrous metals industries—a trend that has been accelerating since World War II—was extended last week by new developments relating to beryllium, magnesium and titanium.

Dow Chemical Co., principal producer of magnesium, has set up a new division, The Dow Metal Products Co., to "facilitate a broad departure from our previous role in the metals field."

The new unit—to be headed by Hubert Fruehauf—will handle production and development work to continue the past year's sharp upswing in sales of magnesium ingots and other magnesium products (*CW Business Newsletter, Aug. 22*); but, in addition, it will "work with any metal that shows promise of increasing the division's earnings." This division takes the place of the Magnesium Products Dept. The Sales Dept. will continue to handle sales of magnesium and other metals.

First Job: At its plant in Madison, Ill., Dow Metal Products will produce a zinc-copper-titanium alloy sheet metal developed by Hydrometals, Inc. (Chicago). The agreement calls for Hydrometals to continue producing this alloy at its Illinois Zinc Division mills at Chicago and Peru, Ill.

Beryllium Corp. (Reading, Pa.) figured in two events last week:

- Its directors called a special shareholders' meeting for Sept. 29 to vote on a recommendation to increase the number of authorized common shares from 1.2 million to 3 million. If this measure is ratified, the directors plan to carry out a two-for-one stock split, which would boost the number of outstanding shares from 624,728 to 1,249,456.
- It completed a major expansion project at its metal fabrication plant in Hazleton, Pa., to meet increased demand for beryllium parts for aircraft, missile and nuclear applications. The company added about 12,000 sq. ft. of floor space at this plant, now has three vacuum hot-press furnace units for production of beryllium components up to 45x60 in. in size.

Brush Beryllium (Cleveland) reported record first-half sales of more than $9.1 million—up nearly 68% from last year's first six months.

CHEMICAL
PUMPS

WORTHITE

TYPE 316 STAINLESS STEEL

Here's proof of Worthite's superior corrosion resistance. Both bars were immersed for 56 hours in 40% sulfuric acid solution at 125° F.

ARE YOU WILLING TO SPEND A FEW PENNIES MORE FOR THIS KIND OF PUMP PROTECTION?

Worthite* has become the standard pump material of the chemical industry for one simple reason: it gives a whale of a lot more corrosion protection for a premium of just a few percent.

This can mean major savings in plant operations. By standardizing on Worthite, you get flexibility to make changes in the process without running up against more corrosive liquids than your pumps can handle.

Here's how Worthite compares with Type 316 stainless steel, a very acceptable corrosion resistant material:

	WORTHITE	TYPE 316 STAINLESS
Chromium	20%	18%
Nickel	24%	14%
Molybdenum	3%	3½%
Silicon	3¼%	1%

Worthite has almost twice as much alloying material, yet it costs but a few pennies more.

What's the reason for Worthite's low price? By standardizing on this one alloy and by quantity buying and production, Worthington has made its price competitive with ordinary stainless steel.

Isn't it time for you to investigate the advantages of Worthite as a standard? Get in touch with your nearest Worthington representative or see Worthington's insert in Chemical Engineering Catalog. Or write to Worthington Corporation, Section 20-7, Harrison, N. J. In Canada, Worthington (Canada) Ltd., Brantford, Ontario.

WORTHINGTON

*Trademark Reg. U.S. Pat. Off.

COMPANIES

Glamorgan Pipe & Foundry Co. (Lynchburg, Va.) has created a Plastics Division for manufacture and sale of polyvinyl chloride pipe. A pipe extrusion plant will come onstream shortly.

•

Bergstrom Paper Co. (Neenah, Wis.) directors have proposed a 50% stock dividend that would increase authorized shares of Class A stock to 600,000 from the present 250,000. Holders of Class B common would receive the dividend in Class A shares.

•

Westinghouse Electric Corp. has formed a new atomic power organization to build a nuclear propulsion plant for the United Kingdom's first atomic-powered submarine, the *Dreadnought*. The U.S. has authorized transfer to the U.K. of a complete *Skipjack*-type submarine nuclear propulsion plant, spare parts, design and related information.

•

General Mills (Minneapolis) has approved a three-for-one common-stock split. The board said the additional shares will be distributed to stockholders in September. The first 30¢ quarterly dividend on the split shares (a 20% increase) will be paid in November. In the fiscal year ended May 31, Board Chairman G. S. Kennedy said, sales and profits reached an all-time high.

EXPANSION

Oleic Acid Derivatives: Emery Industries (Cincinnati) has begun a $6-million project to increase capacity for azeleic and pelargonic acids from oleic acid by ozone oxidation. Also planned: increase of esterification capacity for Emery's line of Plastolein plasticizers and Emolein diesters for jet-engine lubricants.

•

Paper: Rome Kraft Co. (Rome, Ga.), jointly owned by Mead Corp. and Inland Container Corp., plans to complete a $27-million container-board plant expansion by early '61. A 500-tons/day container-board paper machine will be installed.

•

Vinyl: J. P. Frank Chemical Corp. will double its polymerization facilities in Brooklyn, N.Y. About one-third of the expansion is already onstream. The company produces PVC resins, vinyl stearate and acetate copolymers, and plasticizers, stabilizers and chelators.

•

Fiber Pipe: The Brown Co. (Berlin, N.H.), which is now building a bituminized fiber pipe plant in Birmingham, Ala., also plans a unit for Hamilton, Ont., Canada. The new Canadian plant will be a joint undertaking of Brown Co. and Building Products, Ltd. (Canada).

Petroleum Products: The Fluor Corp. (Los Angeles) has been awarded a $2-million contract for construction of a 30,000-bbls./day hydrotreater unit in Shell Oil Co.'s Deer Park, Tex., refinery. Completion date: next April.

•

Ink: General Printing Ink Co., a division of Sun Chemical, is building a plant to make lithographic, flexographic and rotogravure inks in Cincinnati.

•

Silica Sand: Northwestern Glass Co. (Seattle) and Smith Brothers Silica Sand Co. (Auburn, Wash.) are principal owners of a new mining and milling project for silica sand, the Lane Mountain Silica Co., in Stevens County near Chewelah, Wash. The silica deposit is expected to produce up to 100,000 tons/year. The company will process 300 tons/day and render the 98.56% pure silica sand to more than 99.5% purity.

FOREIGN

Acrylic Fiber/West Germany: Farbenfabriken Bayer AG. (Leverkusen) will up production of acrylic fiber (Dralon) to 10,000 metric tons/year by the end of '59, and to 25,000 tons by '61. Bayer is Europe's biggest acrylic fiber producer, despite British expansion plans slated to increase production to 12,000 tons by '61. France's '61 goal is 4,000 tons; and Holland's Du Pont plant will have 5,000-tons initial capacity.

•

Rubber, Plastics/East Germany: East Germany's second carbide factory is now being built at the Buna Werke of Schkopau. The plant is expected to go onstream by early '62, yielding 90% more raw material for production of synthetic rubber and plastics.

•

Oil/West Germany: Plans have been proposed by four groups for oil pipelines from the Mediterranean to Bavaria with one or more refineries at the terminal. The Swiss government has approved Italian plans to build one pipeline from Genoa to Switzerland, and another from Venice to Munich. In embryo stage: plans of Darco-Mineraloelversorgungs GmbH. (Munich) and German oil and steel companies for transalpine pipelines to Bavaria.

•

Rubber/Malaya: Dayton Rubber International will supply technical know-how for a $10-million tire factory in Malaya. Malayans hired later to operate the plant will be trained in the U.S. by Dayton.

•

Engineering/England: Head Wrightson & Co. Ltd. (Thornaby-on-Tees) and Arthur G. McKee & Co. (Cleveland, O.) have formed a new international company, McKee Head Wrightson, Ltd. (London). The new concern will handle designing, engineering and building of petroleum refineries and chemical plants.

Aerosol packaging captured 41% of the $119,000,000 insecticide market

If your product can be brushed, poured, sprayed or squeezed, this profitable new packaging idea can generate sales for you, too!

Consumers spent more than $119,000,000 for bug killers in 1958, and aerosol packaging controls the most profitable share of this growing market. $49,000,000 worth of aerosol-packaged insecticides were sold at 3 times more retail profit per unit than insecticides packaged by other methods.

The reasons for this success are simple. Aerosols deliver the product in a completely new form that's easier, more effective and often more economical to use. If your product can be brushed, poured, sprayed or squeezed, you stand a good chance to add new sales appeal—create vast new markets—if you package it in an aerosol.

It is not necessary to set up your own packaging line to enter this field. A custom filler near you has the knowledge and equipment to help in every area, from planning through production.

If you don't know the name of a custom filler, write Du Pont. We'll send you a list and include survey data on your market for aerosol products, plus information about Freon* propellents for aerosols. "Freon" is preferred by custom fillers and is used in more of today's aerosols than any other propellent. Write E. I. du Pont de Nemours & Co. (Inc.), "Freon" Products Division 338, Wilmington 98, Delaware.

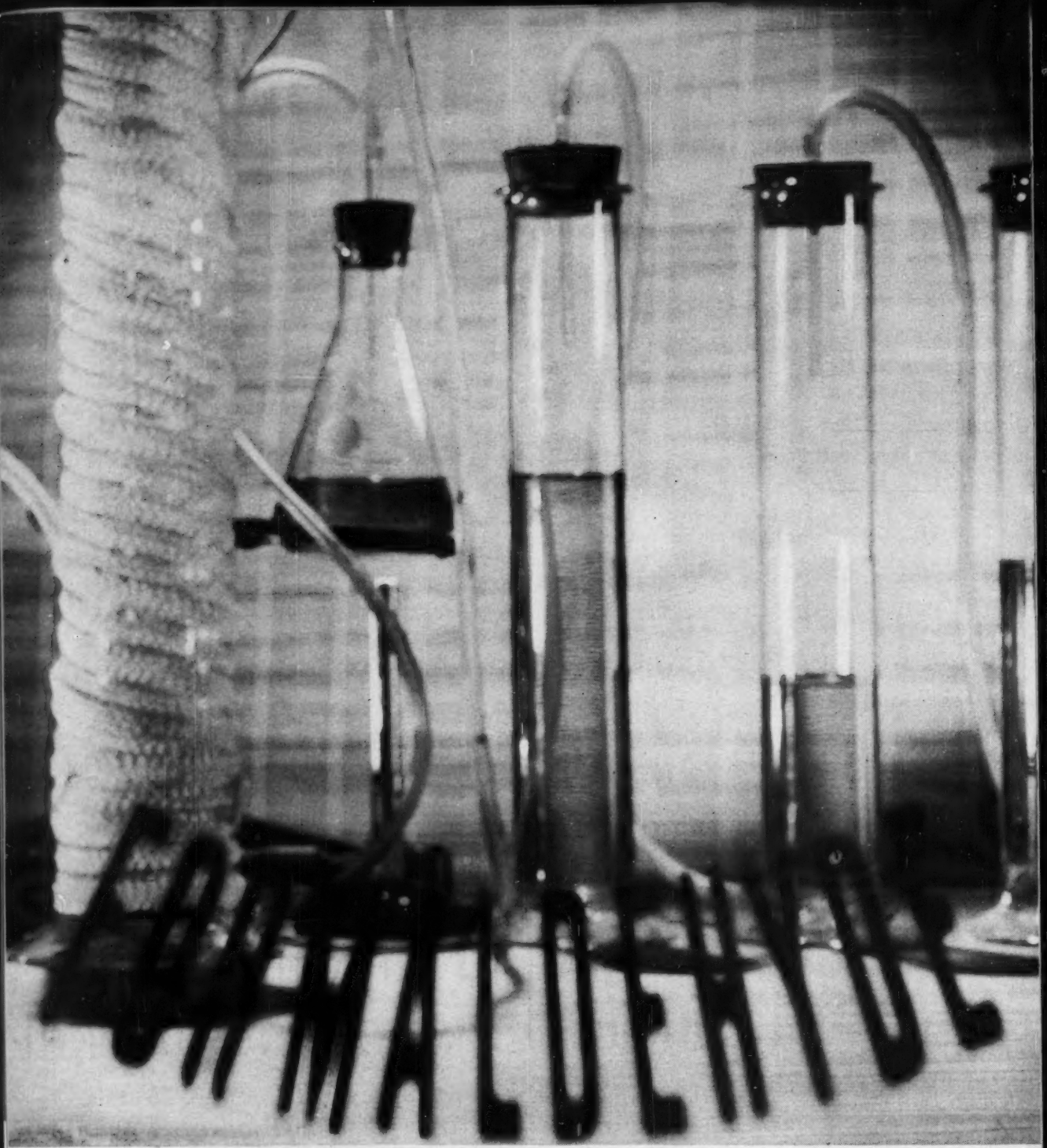
Best-selling aerosols are powered with

FREON®
PROPELLENTS

DU PONT
REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

*Freon and combinations of Freon- or F- with numerals are Du Pont's registered trademarks for its fluorinated hydrocarbon propellents



FORMALDEHYDE . . . reflecting your need in quality and service. As a leading producer of formaldehyde, Heyden Newport offers you a product of uniform high quality in all commercial concentrations. Quick delivery and expert technical assistance are other reasons for choosing Heyden Newport as your primary supplier:

Formaldehyde U.S.P.
37% Formaldehyde, Methanol-Free • 44% Formaldehyde, Methanol-Free, and Inhibited
45% Formaldehyde, Methanol-Free, and Inhibited • 50% Formaldehyde, Methanol-Free

For complete data, write today.

FINE HEYDEN CHEMICALS ®

HEYDEN CHEMICAL DIVISION

Heyden Newport Chemical Corp., 342 Madison Ave., New York 17, New York

HEYDEN NEWPORT ®

1593

Washington
Newsletter

CHEMICAL WEEK
August 29, 1959

A color additives bill has been approved by the Senate Labor and Public Welfare Committee without even a hearing. But the House Commerce Committee is not likely to act with such dispatch and may not get around to it at all this session. Only real pressure from industry would spur House action before adjournment, according to one Capitol Hill expert, who notes the tendency of House committees to take a more thorough look at this type of legislation. Such industry pressure is unlikely this year.

The Senate bill, agreed to generally by industry, allows the Food & Drug Administration to set tolerances for colors as it does for other food additives. It would require manufacturers to submit proof of safety of colors within 30 months of passage of the bill.

Two amendments accommodate industry: (1) Any substance deemed safe under the food additives amendment would also be considered safe in a color; (2) if no public threat is involved, FDA could waive the requirement that a manufacturer spell out methods of determining safety. What industry did not get: a "grandfather clause" exempting substances long in use with no history of injury to consumers.

•

Roadblock to the bill in the House: Rep. James J. Delaney (D., N.Y.), a member of the Rules Committee. He says he will probably propose the same amendment to the color bill that he succeeded in attaching to the food additives law—banning completely any substance that might cause cancer if consumed in large amounts even though there is no evidence it is harmful in small amounts.

Delaney's move would be most effective in situations like that on food additives, which came up for final consideration in '58, three days before Congress adjourned. At such a time, the complicated House rules can be bypassed only by obtaining the unanimous consent of all members. Delaney last year threatened to block passage of any food additives law unless his name appeared on some amendment—and the cancer amendment was drafted to meet his demands, even though such testing was already covered elsewhere in the bill.

House and Senate committees had already rejected such an amendment on grounds that it was unnecessary. And this year, the Senate committee, in approving the food color bill, struck out the Delaney cancer amendment language that had been included in the draft bill submitted to it by the Food & Drug Administration.

•

Tax reform hearings this fall may lead to some tax cuts—and loophole closing—before the '60 elections.

These are the first general tax hearings since the ones of '53, which resulted in split income advantages and better depreciation rates.

Washington Newsletter

(Continued)

Wilbur Mills (D., Ark.), chairman of the House Ways & Means Committee, talks of lengthy hearings running beyond the next election. But political pressure will be strong for some kind of tax break, probably coupled with tightening of exclusions.

The first spate of hearings, from Nov. 2 to Dec. 4, will cover the whole field. Among the experts from business, labor and the universities who are scheduled to testify: Ralph Burgess of American Cyanamid on dividends, William Horne, Jr., of Olin Mathieson and Charles Orem, Jr., of Sylvania Electric on research and development expenditures.

•

A bill to encourage foreign investment through tax incentives, already through committee, will probably win House approval this session. With only lukewarm Administration backing, it is not likely to reach a Senate vote this year, but it should have a good chance next session.

The modified version of the bill, sponsored by Rep. Hale Boggs (D., Ala.), does not go as far as backers hoped, but it does defer U.S. taxes on profits earned overseas until the money is repatriated to the U.S.

•

Expansion of U.S. chemical trade to Argentina will depend greatly on prices and the credit facilities American firms can offer in competition with established European suppliers, says a Commerce Dept. report.

Import costs for Argentine firms have been hiked by surcharges, requirement of a prior 180-day deposit, and abolition of the official rate of exchange in favor of the higher free-market rate. The country may manufacture more chemical products, including synthetic rubber and carbon black.

•

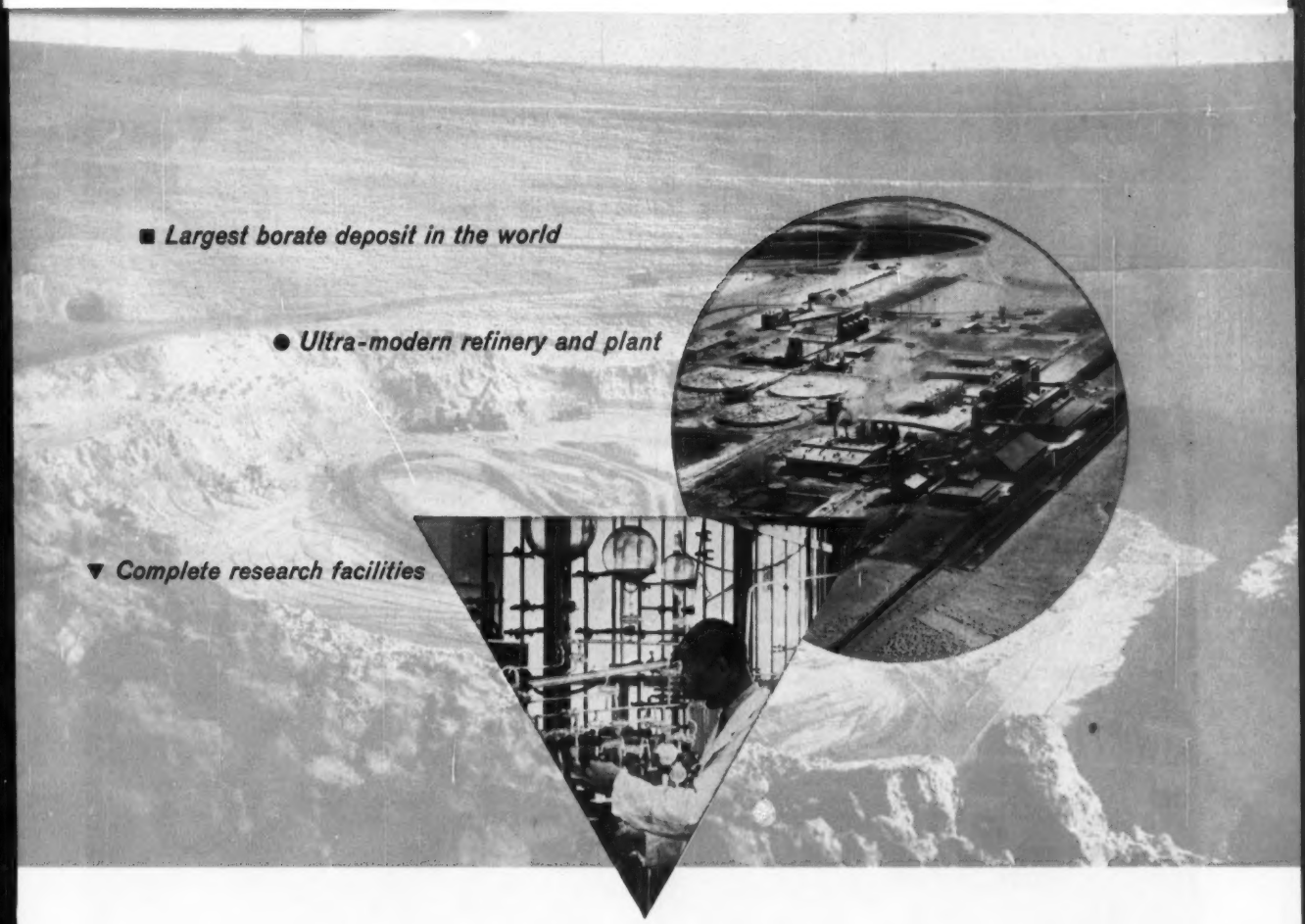
U.S. trade with Soviet Russia spurted in the first quarter of '59. Exports to Russia were $2.5 million, compared with $3.4 million during all of '58. Imports were $9.6 million, against $17.6 million in all of '58.

The rise is accounted for largely by a few transactions, however. One shipment of carbon steel sheets to Russia accounted for $2.1 million. The U. S. bought more furs, chrome, platinum and benzene—traditional Soviet exports to the U.S. Total exports to the eastern European bloc, including Russia, dropped below any quarter in the previous year. Trade with Russia still amounts to only 0.5% of total U.S. trade each way.

Applications for export licenses rose slightly in the second quarter of '59. But the Commerce Dept. rejected the majority of applications—as usual.

•

The House defeated a move to expand barter of surplus crops for strategic metals and minerals. But later it reversed its own committee and voted a straight one-year renewal of the $150-million barter program. The Senate is expected to follow suit.



IF IT CONTAINS BORON...

we have it–or we can make it for you!

Count on us to supply you with the particular boron-source material you want. Meeting exact needs of industry for boron, in forms both old and new, is our specialty today – just as it has been for the past sixty-odd years! Our mines, refinery, and research facilities, are geared solely to producing high quality boron products in the greatest assortment imaginable. Included, for your research and special needs, is a wide variety of inorganic and organic boron compounds. That's why you'll probably discover a ready-made answer to your boron requirement already exists ...but if not, we can make it for you. Remember... for B_2O_3 in any form... buy where borax is basic.

UNITED STATES BORAX & CHEMICAL CORPORATION

NEW PRODUCT DEVELOPMENT DEPARTMENT
U. S. BORAX RESEARCH CORPORATION
412 CRESCENT WAY, ANAHEIM, CALIFORNIA

PRODUCT DEVELOPMENT DEPARTMENT
PACIFIC COAST BORAX COMPANY DIV.
50 ROCKEFELLER PLAZA, NEW YORK 20, N. Y.

HAVE YOU EVALUATED THESE NEWEST BORON PRODUCTS?

BORESTER® BORIC ACID ESTERS in solid and liquid forms with a variety of properties – hydrolytic stability, water solubility, solubility in organic solvents, etc. Experimental quantities are available in one-pound and five-pound lots at reasonable prices. Prices on commercial quantities quoted on request. Data sheets are available for each ester.

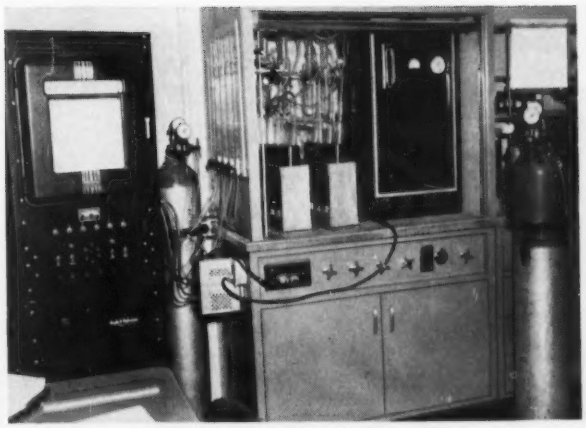
ELEMENTAL BORON is available in *amorphous* and *crystalline* forms at realistic prices. Write today for price schedule and data sheets.
Address U.S. BORAX RESEARCH CORPORATION, Dept. GGC,
412 Crescent Way, Anaheim, California.

CYANAMID

Chemical Newsfront

DUST AND LINT GET THE BRUSH-OFF from surfaces made from materials treated with CATANAC® SN *Antistatic Agent*. (triangle, left, above.) The outstanding quality of CATANAC SN is its ability to prevent the accumulation of static charge on a wide variety of substances including textiles, plastics, paper, surface coatings, glass and many others. Application is made by spray, brush, wiping, dipping, or, with plastics and resins, by incorporation into the molding composition. Materials containing CATANAC SN will retain their antistatic quality even after soap and water washings. This new antistatic agent is easy to apply and economical. It is ideal for use wherever undesirable static charge is present. **(Market Development Department)**

ELECTRODE HOLDERS ARE COLORFULLY INSULATED with LAMINAC® *polyester pre-mix molding compound*. Lenco Inc., maker of welding accessories, uses LAMINAC pre-mix in electrode holders because of its high impact strength, excellent flame and heat resistance, low moisture absorption, good electrical properties. The colors, red on tips and trigger, yellow on handle, are molded into the glass-filled LAMINAC for instant identification and safety. Lenco molds the parts in low-pressure compression presses, heated to about 350° F. Because LAMINAC has exceptionally good flow, high molding pressures are not needed to achieve sharp reproduction of mold contours. **(Plastics and Resins Division)**



UNIQUE TEST SPEEDS RUBBER'S WAR ON OZONE. Ozone can attack rubber, and cause such damage as cracked tire walls, severely shortening the life of rubber products. Cyanamid has recently developed an effective laboratory procedure for screening organic compounds as potential antiozonants. In this way, scientists can narrow the search through the many organic compounds to help determine which show enough promise to make actual field testing in rubber worth while. The screening method measures the ability of a compound to suppress reaction of ozone with a model unsaturated hydrocarbon. This latest tool in the war on ozone is already hard at work in Cyanamid's program to develop more effective antiozonants. **(Rubber Chemicals Department)**

GREATER DRY STRENGTH FOR PAPER PRODUCTS is being achieved in scores of mills with ACCOSTRENGTH® RESIN 2386. A synthetic, water soluble polymer, ACCOSTRENGTH 2386 is used for either stock addition or surface application to paper and paperboard. Improved dry strength is evidenced by higher tensile strength, greater folding endurance, added bursting strength and increased inter-fiber bonding and wax pick. ACCOSTRENGTH 2386 has unique ability to bring about greater dry strength with little change in bulk or porosity and thus proves highly valuable in the manufacture of printing papers and similar grades. **(Paper Chemicals Department)**

INSECTS DROP LIKE FLIES. Currently, over 100 formulators are using Cyanamid's MALATHION in insecticides. A unique phosphorus-sulfur containing compound, MALATHION harms neither man nor his animal friends. Yet it brings death, swift and sure, to bugs and insect pests by attacking vital nerve centers in their bodies. Malathion-base insecticides are used to protect fruits, vegetables, ornamentals, livestock and household pets. Its low toxicity to man and animals makes it one of the safest insecticides in the market today. **(Agricultural Division)**

For further information on products in this advertisement wire, phone—or mail this coupon to:

AMERICAN CYANAMID COMPANY
30 Rockefeller Plaza, New York 20, N. Y.

Please send me additional information

- ☐ CATANAC® SN Antistatic Agent
- ☐ LAMINAC® polyester pre-mix molding compound
- ☐ ACCOSTRENGTH® RESIN 2386
- ☐ MALATHION
- ☐ ANTIOZONANTS

Name_____

Company_____ Position or Title_____

Address_____

City_____ Zone_____ State_____

CYANAMID

AMERICAN CYANAMID COMPANY
30 ROCKEFELLER PLAZA, NEW YORK 20, N. Y.

Chemical Week Report

Deep in Southern forest, logger wields machine saw on tree that will help feed growing worldwide appetite for chemical cellulose.

CELLULOSE

Relatively unfamiliar outside of the pulp industry, chemical cellulose is nevertheless one of the world's most versatile chemical raw materials. Worldwide capacity will soon reach 4 million tons/year—but consumption lags by over 1 million tons. The outlook is bright, as chemical cellulose's end-use pattern diversifies, and established outlets — e.g., rayon, acetate, cellophane, plastics—move toward new heights.

CW Report

Facts and figures define the many-faceted

THIS SHAPES UP as a good year for chemical cellulose. But to an industry laboring under depression clouds for the past few years, any change for the better will be more like the peeping of the sun through an overcast than the start of a blue-sky prosperity.

Nonetheless, note these apparent areas for optimism:

• Production. North American (U.S. and Canadian) producers of chemical cellulose from wood are revving up operations that will carry total output on an uninterrupted climb to nearly 2 million short tons/year by '65 (*see graph, p. 55*). In addition, cotton linters pulpmakers may, by then, be turning out almost 200,000 tons/year. (Comparison note: combined chemical wood and cotton cellulose production in North America last year was just a shade over 1,369,000 tons.)

• Consumption. Increasing world use of chemical cellulose for established outlets (e.g., rayon, acetate, cellophane, plastics), and a raft of potentially "big time" uses, including manufacture of specialty papers and as a raw material for other chemicals, are straining available woodlands in Europe, Asia and other parts of the world. One certain result: overseas markets, especially for higher grades of U.S. cellulose, will broaden considerably.

But U.S. chemical wood cellulose expansions coming onstream this year will add to the industry's acute overcapacity. By the end of '59, the excess of capacity over demand in dissolving wood pulp alone will be well over 400,000 tons/year.

Chemical cellulose is often called "dissolving pulp," "high alpha pulp," "special alpha" or "highly purified cellulose," but none of these terms is precisely descriptive or strictly synonymous. "Chemical cellulose," however, is a handy label for the forms of cellulose refined enough for chemical use. Most cellulose, of course, is used in papermaking (*see chart below*).

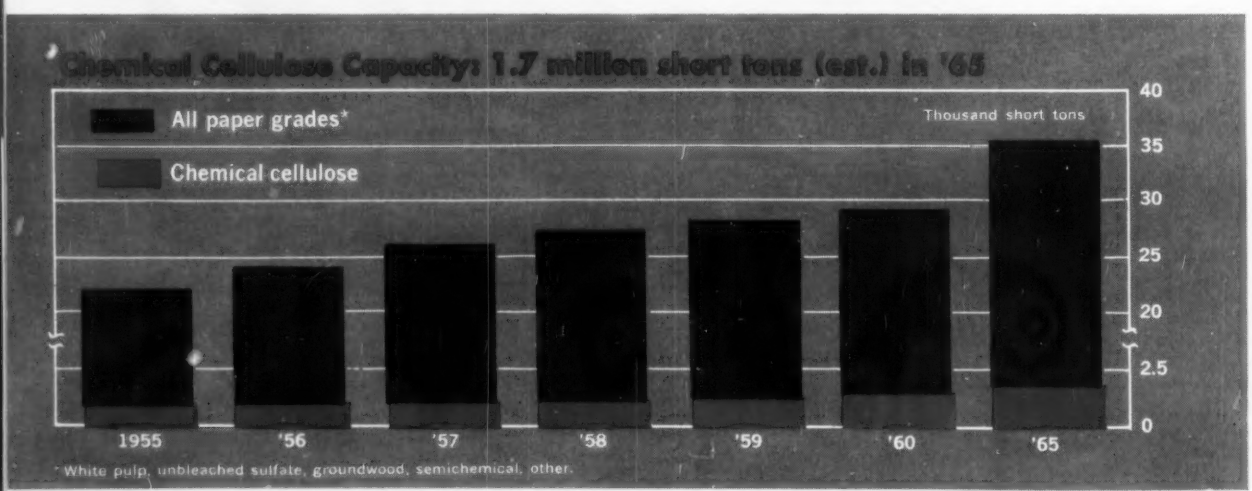
The capacity/demand picture for cotton linters cellulose is not as depressing as that for chemical wood cellulose, although on the surface it does appear so. Three U.S. producers—Buckeye Cellulose (only company in the industry turning out pulp from both wood and cotton linters), Hercules Powder and Southern Chemical Cotton—together have an estimated capacity of 288,000 tons (*see table, p. 58*). Much of this capacity represents obsolete equipment, but more than enough is operable to supply today's rate of market demand—some 145,000 tons/year.

Earlier this year two-way producer Buckeye (a Procter & Gamble subsidiary) began operations (although construction was completed in '58) at a new, $20-million mill. The new unit doubles the original capacity of Buckeye's five-year-old wood-pulp plant at Foley, Fla., boosts potential at that location to 200,000 tons/year of dissolving pulp, or 266,000 tons of paper pulp. (The firm's cotton linters plant—115,000 tons/year—is at Memphis, Tenn.)

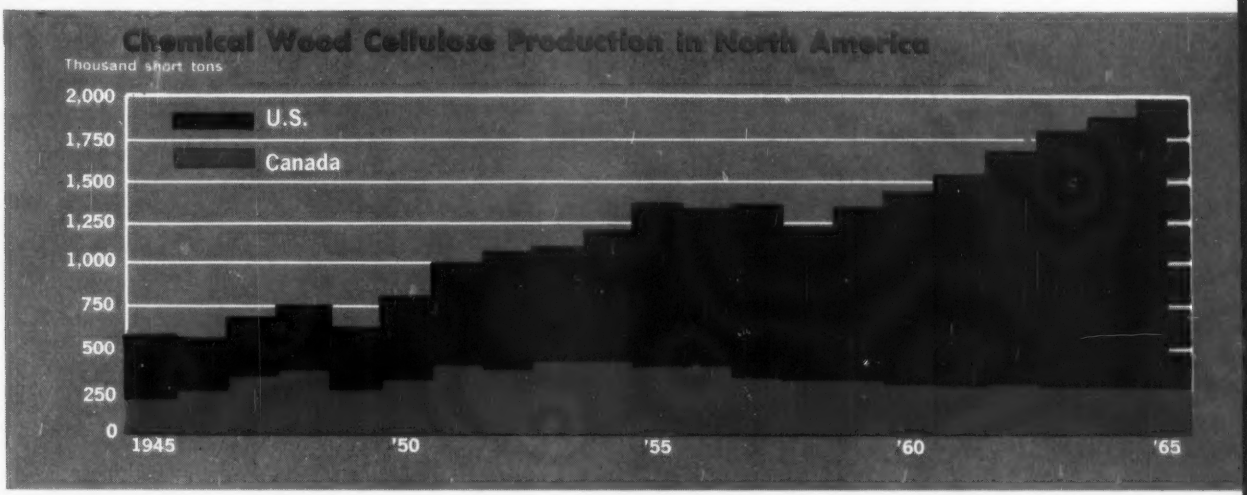
Only other new chemical cellulose installation in North America is the currently building Alaska Lumber & Pulp plant at Sitka, Alaska. Output of the estimated 100,000-tons/year plant (scheduled to be completed late this year), is slated for Japanese consumption. Parent company Alaska Pulp, which is building the plant, is a U.S. corporation, though fully controlled by Japanese interests.

The Sitka mill will push effective operating capacity in North America to about 2 million tons/year—probably enough to supply all annual foreseeable requirements in the next six or seven years.

Actually, the term "capacity," when applied to the chemical cellulose industry, is indefinite and not nearly



future of a truly international chemical raw material



as meaningful as it is in other industries. Reason: paper pulp can also be made in chemical cellulose plants, though few paper pulp mills can make chemical cellulose; the shift can be made with little lost time.

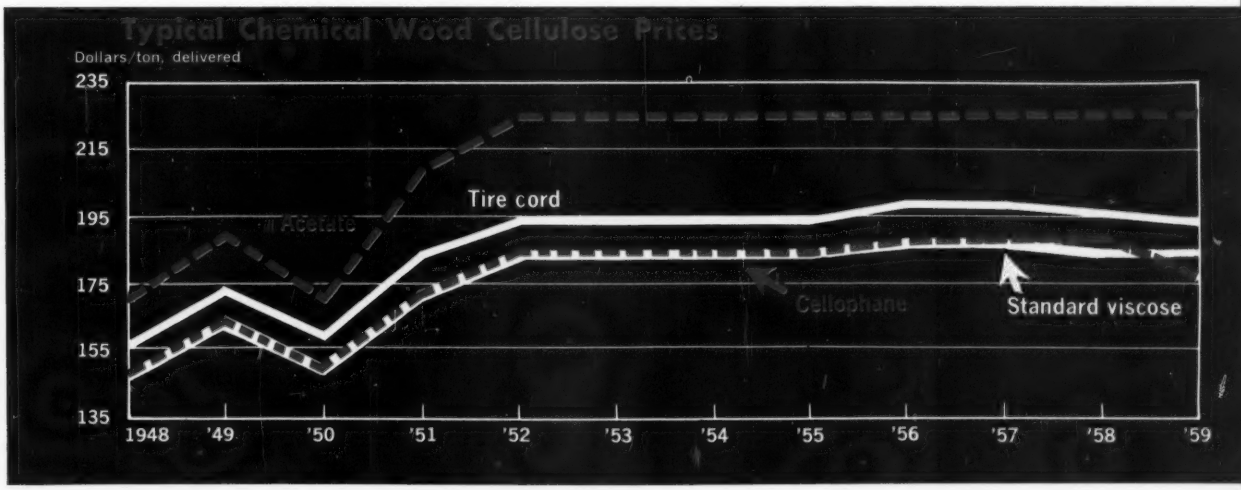
Division of tonnage capacity between the two types of pulp is generally determined by the relative demand for each. Thus, the available capacity for chemical cellulose may be considerably larger than the stated capacity, since much of the productive potential can be used for paper pulp. Chemical cellulose production well under capacities does not pose a situation as grim as below-capacity operation in other industries.

Who's Who: North American producers of chemical cellulose are classified into three groups: (1) "full-line" market producers; (2) "limited-line" producers; (3) captive producers.

The full-line producers, long active in research and product development, generally try to manufacture grades of cellulose to meet specific market requirements. They operate plants using the chief sulfate and sulfite manufacturing processes, and can use a variety of wood supplies. These full-line companies, too, are extremely flexible and are able to produce as many as 25 grades, or types, of cellulose.

Heading the companies in this category are Rayonier Inc. and International Paper Co. Each operates plants in Canada and in the U.S. (*see table, p. 61*) and maintains distribution setups covering most of the Western world. Competition between the two on quality, price and service is understandably keen.

Buckeye, like Rayonier and IP, also directs much of its marketing effort toward new uses for chemical



Supply of U.S. Chemical Wood Cellulose in 1958

(Short tons)

Total shipments by U.S. pulp producers		**915,588**
Shipments to U.S. consumers		685,327
Imports		188,005
From Canada	183,707	
From So. Africa	2,335	
From Norway	1,963	
Exports		**230,261**
To Western Hemisphere		**46,057**
Canada	12,348	
Brazil	2,597	
Chile	4,402	
Colombia	6,004	
Cuba	6,836	
Mexico	12,768	
Perú	992	
Venezuela	110	
To Europe		**144,423**
Austria	1,324	
Belgium	4,448	
France	37,109	
W. Germany	35,276	
Ireland	785	
Italy	11,101	
Netherlands	6,747	
Spain	1,945	
Sweden	1,783	
Switzerland	3,362	
United Kingdom	40,543	
To Asia, Africa, Pacific		**39,781**
Australia/New Zealand	6,674	
Egypt	2,257	
Formosa	2,475	
India/Pakistan	5,577	
Korea	11	
Japan	22,787	
U.S. chemical wood cellulose receipts		873,332
U.S. intraplant movement		15,411
Total apparent chemical cellulose demand		888,743

cellulose; it offers and manufactures eight or nine specific grades. Buckeye entered the wood cellulose business in '54; but for many years prior, it was big in purified cotton linters. Its Foley plant is a sulfate mill utilizing Southern pines and hardwoods as raw materials (*CW, May 23, p. 85*).

Among the second important category of producers —those offering limited lines—are several paper pulp suppliers that have equipped one or more plants to produce chemical wood cellulose. Though less active in market development than full-line producers, their concentration on one or two relatively narrow areas makes for rough competition in these specific fields. Makers of purified cotton linters, Hercules Powder and Southern Chemical Cotton, are included in this category.

Weyerhaeuser Timber Co. and Brown Co. are two wood cellulose producers with limited lines. Weyerhaeuser is active in cellophane and nitration grades and in some purified types for specialized paper applications. Brown competes in supplying cellulose for cellophane and has a range of pulps for certain other specialized uses. Scott Paper's Soundview Division at times has supplied nitration cellulose for the government, and a small Canadian producer, Restigouche, has offered cellophane pulp.

The cellulose shortages following World War II pressured two major users to build their own cellulose production facilities. Celanese Corp. of America, through subsidiaries, built a mill at Prince Rupert, British Columbia, in '51. Three years later, American Viscose, in partnership with Puget Sound Pulp & Timber, brought a mill into operation at Ketchikan, Alaska.

Celanese's Columbia Cellulose plant (120,000 tons/-year) produces acetate cellulose and standard viscose pulps. The Ketchikan plant turns out pulp for rayon staple fiber and cellophane.

The war period also provided impetus for today's 288,000 tons of nominal chemical cotton cellulose capacity. Sky-rocketing requirements for smokeless powder and for tire cord had the military practically confiscating all cotton linters pulp output in the U.S. and demanding more.

Much of the 288,000 tons/year capacity—probably more than 100,000 tons of it—is obsolete equipment that could be reactivated and operated at great expense, if it were desperately needed.

But chances are that so much capacity will never again be needed in the U.S., chiefly because of the present ample chemical wood cellulose productive potential. But even if that much were needed, all linters pulp facilities could not be utilized, since available raw linters supply is becoming increasingly limited. The

industry, as a whole, can probably produce no more than 180,000 tons/year of chemical cotton cellulose because of this raw-material situation.

Matched against the current market requirement of 145,000 tons/year, the industry would appear to have a cushion of less than 50,000 tons/year.

Worldwide Spread: The chemical cellulose business is a world business, and the commodity is almost unique in that it flows freely between continents relatively unhampered by tariff restrictions. Even Sweden, which is traditionally one of the major world market suppliers of chemical cellulose, imports some of its requirements from Rayonier.

During World War II, trade channels were disrupted. North American producers, particularly those in the U.S., had to contract sales, confine them to meeting domestic demand. But even in postwar years, U.S. firms did not, for the most part, immediately re-enter world markets. There were two reasons: (1) demand for chemical cellulose on the home front expanded rapidly; (2) there was some hesitancy in putting money into additional capacity. Canadian mills, however, did continue to supply European and Japanese outlets at a modest rate.

By '52, American suppliers were ready to re-enter world markets. Despite a buildup of foreign chemical cellulose sources and sharp price competition from Scandinavian sellers, North American companies were, by last year, marketing nearly half the world's available supply (*see table, p. 60*). The U.S., specifically, has been responsible for the startling geographic shift in cellulose supply; U.S. cellulose from wood pulp, for example, increased from 341,000 tons in '48 to approximately 933,000 last year.

Buildup Abroad: During the past decade, foreign production of chemical cellulose for home consumption has risen to impressive levels. For example, Germany has raised its capacity to about 250,000 tons/year, and Austria to a respectable 88,000 tons. All told, non-Scandinavian European countries now operate an installed capacity totaling 530,000 tons/year, compared with the combined Sweden-Finland-Norway total of 835,000 tons/year.

Increasing Scandinavian competition and the rise in "captive" production in Europe would appear to mitigate chances of North American sellers to expand business in Europe. Actually, however, some knowledgeable trade observers believe that the bright hope for U.S. cellulose producers lies more in exports than in growth potential of domestic outlets.

Two reasons favoring exporting:

(1) Even with increased production, supply of European (including Scandinavian) chemical wood cellulose is falling, and will continue to fall—short of growing

U.S. Chemical Wood Cellulose End-Use Pattern, 1959 (est.)

(Short tons)

High-tenacity viscose		144,600
Tire cord	139,300	
Belting, straps, etc.	5,300	
Standard viscose filament		86,500
Knit goods (hosiery, circular, warp)	13,500	
Woven goods (apparel, household, auto and industrial fabrics, ribbons, etc.)	53,900	
Miscellaneous	15,400	
Exports	3,700	
Acetate filament		84,600
Knit goods	12,900	
Woven goods	65,400	
Miscellaneous	4,100	
Exports	2,200	
Viscose and acetate staple		192,600
Cotton system and rayon-type spinning (dresses, bathing suits, scarves, shirts, household fabrics, etc.)	115,700	
Carpets and rugs, blended and unblended fabrics for apparel and household fabrics, other apparel fabrics, nonwoven textiles, sanitary and surgical applications, etc.	76,900	
Cellophane		222,000
Plastics		106,100
Cellulose acetate and mixed esters (film, sheets, rods, tubes, molding and extrusion material)	40,400	
Other plastics (nitrocellulose sheets, rods and tubes, as filler with resins)	25,800	
Latex saturation, laminates	39,900	
Other chemical cellulose end-uses		147,700
Flocking (sanitary pads, welding rods, etc.)	45,600	
Filtration media (automotive, industrial, cigarette, etc.)	47,200	
Specialties (photographic film and paper, sponges, carboxymethyl cellulose, lacquers, etc.)	54,900	
Total		984,100

Supply of U.S. Chemical Wood Cellulose in 1958

(Short tons)

Total shipments by U.S. pulp producers		**915,588**
Shipments to U.S. consumers		685,327
Imports		188,005
From Canada	183,707	
From So. Africa	2,335	
From Norway	1,963	
Exports		**230,261**
To Western Hemisphere		**46,057**
Canada	12,348	
Brazil	2,597	
Chile	4,402	
Colombia	6,004	
Cuba	6,836	
Mexico	12,768	
Perù	992	
Venezuela	110	
To Europe		**144,423**
Austria	1,324	
Belgium	4,448	
France	37,109	
W. Germany	35,276	
Ireland	785	
Italy	11,101	
Netherlands	6,747	
Spain	1,945	
Sweden	1,783	
Switzerland	3,362	
United Kingdom	40,543	
To Asia, Africa, Pacific		**39,781**
Australia/New Zealand	6,674	
Egypt	2,257	
Formosa	2,475	
India/Pakistan	5,577	
Korea	11	
Japan	22,787	
U.S. chemical wood cellulose receipts		873,332
U.S. intraplant movement		15,411
Total apparent chemical cellulose demand		888,743

cellulose; it offers and manufactures eight or nine specific grades. Buckeye entered the wood cellulose business in '54; but for many years prior, it was big in purified cotton linters. Its Foley plant is a sulfate mill utilizing Southern pines and hardwoods as raw materials (*CW, May 23, p. 85*).

Among the second important category of producers —those offering limited lines—are several paper pulp suppliers that have equipped one or more plants to produce chemical wood cellulose. Though less active in market development than full-line producers, their concentration on one or two relatively narrow areas makes for rough competition in these specific fields. Makers of purified cotton linters, Hercules Powder and Southern Chemical Cotton, are included in this category.

Weyerhaeuser Timber Co. and Brown Co. are two wood cellulose producers with limited lines. Weyerhaeuser is active in cellophane and nitration grades and in some purified types for specialized paper applications. Brown competes in supplying cellulose for cellophane and has a range of pulps for certain other specialized uses. Scott Paper's Soundview Division at times has supplied nitration cellulose for the government, and a small Canadian producer, Restigouche, has offered cellophane pulp.

The cellulose shortages following World War II pressured two major users to build their own cellulose production facilities. Celanese Corp. of America, through subsidiaries, built a mill at Prince Rupert, British Columbia, in '51. Three years later, American Viscose, in partnership with Puget Sound Pulp & Timber, brought a mill into operation at Ketchikan, Alaska.

Celanese's Columbia Cellulose plant (120,000 tons/-year) produces acetate cellulose and standard viscose pulps. The Ketchikan plant turns out pulp for rayon staple fiber and cellophane.

The war period also provided impetus for today's 288,000 tons of nominal chemical cotton cellulose capacity. Sky-rocketing requirements for smokeless powder and for tire cord had the military practically confiscating all cotton linters pulp output in the U.S. and demanding more.

Much of the 288,000 tons/year capacity—probably more than 100,000 tons of it—is obsolete equipment that could be reactivated and operated at great expense, if it were desperately needed.

But chances are that so much capacity will never again be needed in the U.S., chiefly because of the present ample chemical wood cellulose productive potential. But even if that much were needed, all linters pulp facilities could not be utilized, since available raw linters supply is becoming increasingly limited. The

industry, as a whole, can probably produce no more than 180,000 tons/year of chemical cotton cellulose because of this raw-material situation.

Matched against the current market requirement of 145,000 tons/year, the industry would appear to have a cushion of less than 50,000 tons/year.

Worldwide Spread: The chemical cellulose business is a world business, and the commodity is almost unique in that it flows freely between continents relatively unhampered by tariff restrictions. Even Sweden, which is traditionally one of the major world market suppliers of chemical cellulose, imports some of its requirements from Rayonier.

During World War II, trade channels were disrupted. North American producers, particularly those in the U.S., had to contract sales, confine them to meeting domestic demand. But even in postwar years, U.S. firms did not, for the most part, immediately re-enter world markets. There were two reasons: (1) demand for chemical cellulose on the home front expanded rapidly; (2) there was some hesitancy in putting money into additional capacity. Canadian mills, however, did continue to supply European and Japanese outlets at a modest rate.

By '52, American suppliers were ready to re-enter world markets. Despite a buildup of foreign chemical cellulose sources and sharp price competition from Scandinavian sellers, North American companies were, by last year, marketing nearly half the world's available supply (*see table, p. 60*). The U.S., specifically, has been responsible for the startling geographic shift in cellulose supply; U.S. cellulose from wood pulp, for example, increased from 341,000 tons in '48 to approximately 933,000 last year.

Buildup Abroad: During the past decade, foreign production of chemical cellulose for home consumption has risen to impressive levels. For example, Germany has raised its capacity to about 250,000 tons/year, and Austria to a respectable 88,000 tons. All told, non-Scandinavian European countries now operate an installed capacity totaling 530,000 tons/year, compared with the combined Sweden-Finland-Norway total of 835,000 tons/year.

Increasing Scandinavian competition and the rise in "captive" production in Europe would appear to mitigate chances of North American sellers to expand business in Europe. Actually, however, some knowledgeable trade observers believe that the bright hope for U.S. cellulose producers lies more in exports than in growth potential of domestic outlets.

Two reasons favoring exporting:

(1) Even with increased production, supply of European (including Scandinavian) chemical wood cellulose is falling, and will continue to fall—short of growing

U.S. Chemical Wood Cellulose End-Use Pattern, 1959 (est.)

(Short tons)

High-tenacity viscose		144,600
Tire cord	139,300	
Belting, straps, etc.	5,300	
Standard viscose filament		86,500
Knit goods (hosiery, circular, warp)	13,500	
Woven goods (apparel, household, auto and industrial fabrics, ribbons, etc.)	53,900	
Miscellaneous	15,400	
Exports	3,700	
Acetate filament		84,600
Knit goods	12,900	
Woven goods	65,400	
Miscellaneous	4,100	
Exports	2,200	
Viscose and acetate staple		192,600
Cotton system and rayon-type spinning (dresses, bathing suits, scarves, shirts, household fabrics, etc.)	115,700	
Carpets and rugs, blended and unblended fabrics for apparel and household fabrics, other apparel fabrics, nonwoven textiles, sanitary and surgical applications, etc.	76,900	
Cellophane		222,000
Plastics		106,100
Cellulose acetate and mixed esters (film, sheets, rods, tubes, molding and extrusion material)	40,400	
Other plastics (nitrocellulose sheets, rods and tubes, as filler with resins)	25,800	
Latex saturation, laminates	39,900	
Other chemical cellulose end-uses		147,700
Flocking (sanitary pads, welding rods, etc.)	45,600	
Filtration media (automotive, industrial, cigarette, etc.)	47,200	
Specialties (photographic film and paper, sponges, carboxymethyl cellulose, lacquers, etc.)	54,900	
Total		984,100

demand. Forest resources on the continent, say these experts, are diminishing rapidly. And despite ingenious use made of types of wood not commonly processed in the U.S. or in Canada, installed cellulose capacity is bumping pretty close to the ceiling of available wood supplies.

(2) On the other hand, growth of chemical cellulose consumption in the U.S. is likely to continue rather slowly, compared with the mushrooming of the past. Rayon, acetate and cellophane, the three major outlets, are relatively mature industries here. And newer uses, such as in cellulose ethers, aren't likely to take impressive amounts of cellulose for some time.

Markets outside the U.S.—long operating on low grades of cellulose—are increasingly demanding higher-quality types, particularly for tire cord, acetate and for improved continuous rayon textile fibers.

All Stops Out: Despite many built-in advantages, American-made wood cellulose had no easy time moving into overseas markets. To achieve the breakthrough, U.S. sellers hauled out a lot of sales promotion gimmicks. Sales offices were opened abroad, offering technical service, common in North America but practically unknown to European cellulose buyers.

Top management people were recruited as salesmen and made frequent visits to managers of big European man-made-textile combines. Major producer Rayonier, for example, actually sent its whole board of directors to Paris a few years ago, where, in addition to holding a regular board meeting, the members met with a group representing every important rayon-producing country in Europe.

Results of such campaigns have been rather dramatic. North America, and especially the U.S., has forged a strong position as a world supplier of chemical wood cellulose. In contrast, total Scandinavian sources provided world markets with approximately 727,000 tons in '58, an increase of only slightly more than 200,000 tons in 10 years. Of the 230,260 tons of U.S. chemical cellulose exports in '58, about 63% went to European consumers (*see table, p. 56*).

Actually, American-made material has just about taken over European markets for high-quality types of cellulose. Continental cellophane and rayon staple plants still run chiefly on local pulps, but as quality demands increase for these end-products European chemical cellulose consumers will seek more North American raw material.

For many years, Japan has been one of the largest outlets for imported dissolving pulps, but more recently its take has been dropping. For instance, Japanese consumers in '56 bought about 127,000 tons of North American chemical cellulose, and the figure dropped to slightly less than 114,500 in '57, and to only 41,500 in '58.

Some trade experts read into this pattern of declining U.S. exports, signs that most of the anticipated loss of Japanese markets has already taken place and that it can be written off as a major buyer of North American pulp.

Manufacturing Methods: Processes for making cellulose from wood can, broadly speaking, be classified as sulfate and sulfite methods. Mills of both types are operating today, but agreement as to relative merits of the processes is far from general.

The sulfate method appears to be favored by merchant producers of chemical cellulose to satisfy demands for highest-quality grades; newer constructions by Rayonier, Buckeye and International Paper have been sulfate plants, although when Rayonier rebuilt and expanded the Port Alice, B.C., mill last year, it retained the sulfite process.

Celanese's demands on its Prince Rupert installation are for acetate grades of chemical cellulose via sulfite, since sulfate acetate types are not yet commercially successful. Output of the Japanese mill is intended, for the most part, to satisfy standard quality needs—a big reason why the sulfite process was adopted.

Basic difference between the sulfite and sulfate processes lies in the nature of the liquor used in cooking

U.S. Chemical Cotton Cellulose End-Use Pattern, 1959 (est.)

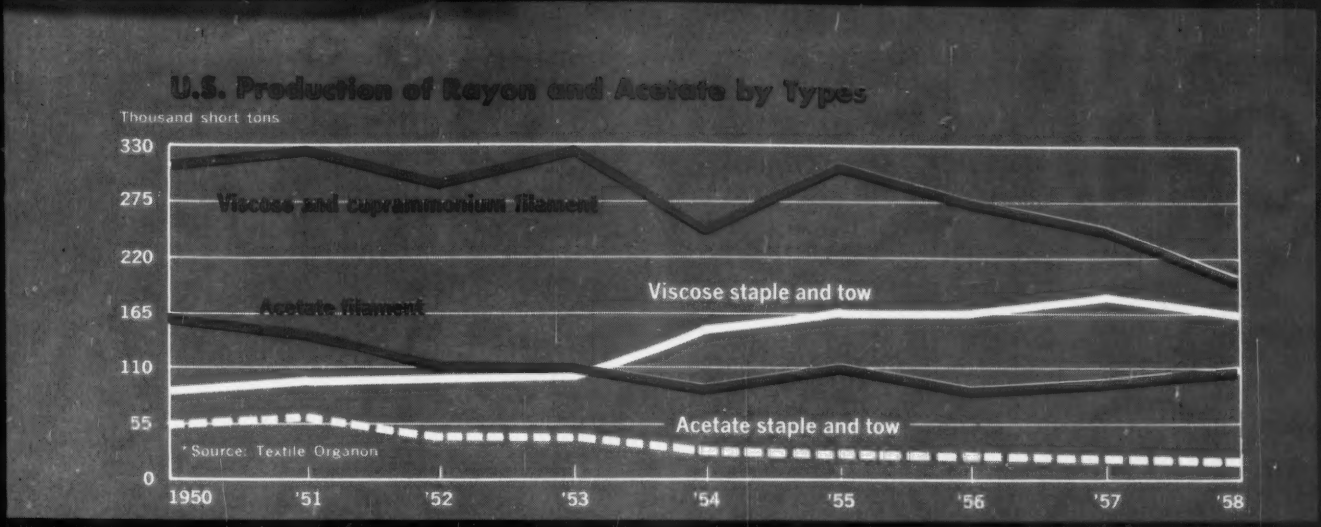
(Short tons)

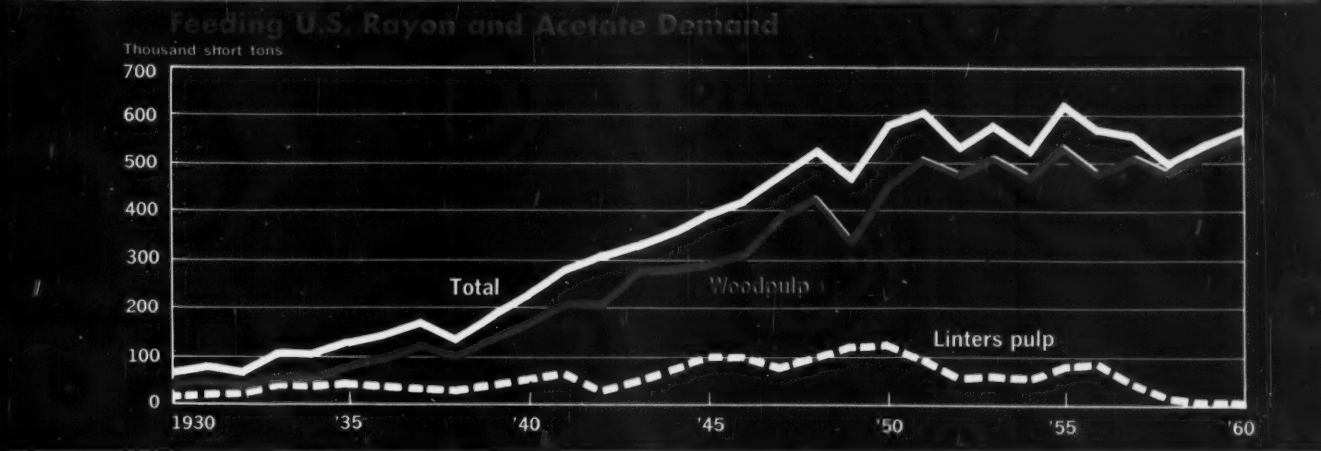
Viscose and acetate textiles	16,500
Cellulose plastics	36,000
Nitrocellulose (lacquers, propellents, dynamite)	9,000
Sausage casings, bands	9,000
Cellulose ethers, other	8,500
Paper	31,000
Export and miscellaneous	34,500
	144,500

U.S. Producers of Chemical Cotton Cellulose

(Short tons/year)

Company	Plant	Capacity
Buckeye Cellulose	Memphis, Tenn.	115,000
Hercules Powder	Hopewell, Va.	115,000
Southern Chemical Cotton	Chattanooga, Tenn.	58,000
	Total	288,000 (est.)





the wood chips. Sulfite liquor, traditionally, is a mixture of sulfurous acid and calcium bisulfite, but newer methods substitute an ammonia, magnesium, or other base, for the bisulfite.

In sulfate cooking, the liquor usually is a solution of caustic soda and sulfur-containing salts, and is alkaline. Until Uddeholms, a Swedish outfit, developed a prehydrolyzed sulfate process during World War II, it was held that sulfate methods would not produce a suitable chemical cellulose. (Prehydrolyzation, essentially, is the pretreating of wood chips in a digester with an acid cooking step before final cooking with the alkaline liquor.)

The Uddeholms product was successful, production was limited, and use confined to Europe. International Paper, Rayonier and Buckeye all worked on variations and improvements of the basic concept, and all were soon to have sulfate process facilities.

Big factor in the choice between a sulfite and a sulfate plant is the problem of waste disposal. Spent calcium-base liquors, in the sulfite method, can only be dumped, and producers located inland know the acuteness of the problem.

Sodium-base sulfite cooking is attracting some attention; it reportedly improves the heat and chemical recovery angles.

In sulfate operations, the spent liquor is burned to provide a big part of the fuel requirements of the plant, and a high level of chemical recovery is attained. The process, of course, doesn't eliminate pollution problems, since liquor from bleaching and refining must be disposed of and some dilute cooking liquor cannot be burned.

First in Sulfate: International Paper's Natchez mill, which was put on line in '51, was the first sulfate unit in North America designed specifically to make chemical wood cellulose. But as is often the case with new grades of cellulose, commercial acceptance of IP's product did not come until well into '52. (New cellulose grades often require major processing changes by consumers; hence, the reluctance to invest additional funds until advantages are proved worthwhile.)

Rayonier with its Jesup, Ga., sulfate mill under construction at the time, but not scheduled for operation until '54, was in a spot to maintain a competitive position in the high-tenacity field against IP's new product.

Rayonier and Buckeye sulfate mills came in during mid-'54, and a three-way battle for outlets began; the fight ranged—and still ranges—over most of the world. The two newcomers, too, were in trouble, until their cellulose was "accepted" more than a year later. In the meantime, IP doubled capacity at Natchez.

Aside from the introduction of prehydrolyzed sulfate cooking, the biggest developments in making chemical

1958 Estimated Western Nations Chemical Cellulose Consumption

(Short tons)

North America		955,900
U. S.	888,700	
Canada	67,200	
Central, South America		64,600
Argentina	8,700	
Brazil	21,500	
Chile	4,400	
Colombia	6,000	
Cuba	6,900	
Peru	1,000	
Mexico	16,000	
Venezuela	100	
Europe		1,079,100
Austria	59,000	
Belgium	37,900	
Finland	19,000	
France	156,800	
W. Germany	269,100	
Greece	1,600	
Holland	49,600	
Italy	135,400	
Norway	17,000	
Portugal	3,400	
Spain	35,500	
Sweden	36,500	
Switzerland	23,000	
Turkey	400	
United Kingdom	234,900	
Orient/Africa		440,855
Australia/New Zealand	6,900	
India/Pakistan	38,600	
Japan	377,800	
Formosa	2,500	
South Korea	25	
Philippines	230	
Egypt	14,800	
	Total Consumption	2,540,455

World* Chemical Cellulose Supply:

Emphasis shifts on main geographical sources . . .

(Thousand air dry short tons)

Wood Pulp	1948	1958
North America		
U. S.	420	933
Canada	341	307
	761	1,240
Scandinavia		
Finland	69	188
Sweden	377	392
Norway	60	147
	506	727
Remainder Europe		
Austria	23	86
W. Germany	87	209
Italy	36	45
Spain	—	25
Turkey	—	2
France	—	56
	146	423
Africa Asia		
Japan	37	327
So. Africa	—	55
	37	382
Grand totals	1,450	2,772
Chemical Cotton		
U. S.	187	129
Other countries	70	122

*Excluding Iron Curtain countries

CW Report

wood cellulose have been in the refining steps. Traditionally, refining is through successive stages of alkaline extraction and chlorine and hypochlorite bleaching.

Chlorine dioxide bleaching is practically universal in all new plants, and is used in many older mills. When used in the later stages of refining, the chlorine dioxide provides excellent color and high purity with minimized degradation of the cellulose. All tire-cord pulps, virtually all acetate grades, some standard viscose grades, and a few nitration cellulose types, are now chlorine dioxide bleached.

A process less generally used, but moving fast, is cold caustic extraction. Caustic at room temperature, or even refrigerated, in an 8-10% solution, is applied in the later stages of operation. Some believe that the process is essential if cellulose purity is to be improved beyond 97-98% without abnormal sacrifice in cellulose yield from wood.

Managements are hesitating to move wholeheartedly into cold caustic extraction, for a couple of reasons: high capital cost of installing the process; the probability of higher operating costs. Some quantities of new 98-99% cellulose are currently being cautiously introduced in tire cords, but an unsettled question is whether such drastic refining will introduce inherent nonuniformity in the molecular structure of the purified cellulose that could detract from its performance in the end-use.

Sulfate cellulose, recall trade observers, came at a propitious time. When rayon tire cord began rolling fast during World War II, the only chemical wood cellulose available was that made via the sulfite process; several types were developed to supply the new high-tenacity outlet.

But it soon became apparent to marketers that the quality of the cellulose was a determining factor in the production of a high-quality rayon cord. Cotton linters were long considered best for the purpose, but rayon manufacturers had to contend with high and fluctuating linter pulp prices.

(Price of basic tire-cord cotton pulp is currently pegged at about $204/ton, compared with $192-195/-ton for wood cellulose. During the war, tags on linter pulp were well over $400/ton.)

Outcome of the price dilemma facing rayon makers: blends of cotton linters pulp and wood pulp were worked out, and some producers actually turned out a competitive tire cord of all-wood cellulose.

With the advent of commercial quantities of sulfate cellulose, Buckeye plugged its product as a "very high purity" pulp to give greater rayon yield. (Others in the trade aver that the difference is only 1%, but concede that it has been a strong Buckeye selling point.)

Rayonier staked its bet on developing the "highest strength characteristics" to carry into the resulting rayon, and emphasized the "high uniformity" of its product.

The three top sulfate pulp producers (IP, Rayonier and Buckeye) are reportedly in another round of the battle for markets. Each is said to have improved products under development, and each has had to consider new major capital investments to produce improved cellulose. A Rayonier official summed up the problem to *CW* this way: in the face of some price softness, a return on these investments is far from assured.

Worldwide Cellulose: The industries using chemical cellulose are worldwide, as reflected by the corporate organization of the industry. Cellulosic fiber and film have been closely tied in from the beginning. Both originated in Europe, and all major manufacturers of these products in the U.S. have either corporate or technical roots abroad.

Among the world's principal buyers of chemical cellulose are these U.S. concerns: American Viscose, Celanese, Du Pont, Eastman Kodak and Tennessee Eastman, Industrial Rayon, Beaunit Mills, Olin Mathieson and Courtaulds (Alabama).

With few exceptions, these cellulose users—U.S. and foreign—depend on outside supplies of chemical cellulose. Besides the mills of American Viscose at Ketchikan and Celanese in British Columbia, Snia in Italy and Alaska Lumber & Pulp at Sitka, Courtaulds operates a cellulose mill in South Africa and Matarazzo has one in Brazil, while Textiles Artificiels et Synthetiques has cellulose-producing affiliates in France.

All told, by the first of next year, world chemical wood cellulose capacity should be close to 4 million tons/year (*see table, right*), with total U.S. capacity at 1.5 million tons, Canada at 545,000 tons, total Europe at nearly 1.37 million tons. South African capacity is about 55,000 tons/year, and Japan will be able to turn out 450,000 tons.

Where To, How Much: Last year's recession was acutely felt in the world's chemical cellulose industry. A measure of the pinch: total Western nations' consumption in '58 was only a shade over 2.5 million tons, well under a million tons below in-place capacity (*see table, opposite page*).

Japan, which consumed about 377,800 tons, and the United Kingdom, about 235,000 tons, ran second and third to the U.S., 888,700 tons, among the chief chemical cellulose users.

U.S. production of chemical wood cellulose (930,000 tons), however, slipped last year to its lowest point since '54's 785,000 tons; it clearly reflects the recent recession

World Chemical Wood Cellulose Capacities

(Short tons/year, Jan. 1, 1960, est.)

United States	Rayonier	570,000
	Jesup, Ga.	
	Fernandina Beach, Fla.	
	Hoquiam, Wash.	
	Port Angeles, Wash.	
	Shelton, Wash. (inactivated)	
	International Paper	290,000
	Natchez, Miss.	
	Buckeye Cellulose (Procter & Gamble)	200,000
	Foley, Fla.	
	Ketchikan Pulp (American Viscose and Puget Sound Pulp & Timber)	180,000
	Weyerhaeuser Timber	80,000
	Everett, Wash.	
	Longview, Wash.	
	Alaska Lumber & Pulp	100,000
	Sitka, Alaska	(Due in late '59)
	Brown Company	80,000
	Berlin, N. H.	
	Total U.S.	**1,500,000**
Canada	Alaska Pine & Cellulose (Rayonier)	135,000
	Port Alice, B.C.	
	Woodfibre, B.C. (inactivated)	
	Canadian International Paper	250,000
	Hawkesbury, Ont.	
	Gatineau, Que.	
	Tamiskaming, Que.	
	Columbia Cellulose (Celanese)	120,000
	Prince Rupert, B.C.	
	Fraser Companies	40,000
	Atholville, N.B.	
	Total Canada	**545,000**
	Total North America	**2,045,000**
Europe	Sweden	460,000
	Germany	250,000
	Finland	210,000
	Norway	165,000
	Austria	88,000
	Italy	88,000
	France	55,000
	Spain	49,000
	Total Europe	**1,365,000**
Others	South Africa	55,000
	Japan	450,000
Grand totals	**North America**	**2,045,000**
	Europe	**1,365,000**
	Other	**505,000**
	World total	**3,915,000**

*Figures may be higher than actual "working" capacities, since most producers also use equipment for paper pulp production.

in the automobile and textile businesses. The drop is underscored in statistics outlining U.S. consumption of cellulose by rayon and acetate outlets (*see graph, p. 59*). These prime end-use applications took 479,000 tons of cellulose in '58, compared with the previous year's 518,000.

If the current uptrend continues—auto and department store sales are considerably higher than comparable periods last year—chances are that chemical cellulose consumption in rayon and acetate uses this year, will top the '57 mark.

The graph also points up the significant downtrend in use of chemical cotton cellulose for rayon and acetate production. In '58, linter pulp had less than 5% of the market—22,000 tons out of a total 501,000. The drop since '56 was startling—some 68,000 tons—and indications are that consumption in these outlets will fall further. Use of chemical cotton cellulose is picking up, however, in many nontire and acetate textile applications, especially sausage casings, paper and nitrocellulose outlets (*see table, p. 58*).

Tire Trend: But the hottest battle continues to be in the high-tenacity viscose field, and chiefly the important tire-cord and fabric portion. As recently as '41, cotton accounted for 93% of the total tire-cord and fabric production (about 258 million lbs.); rayon and then-newcomer nylon shared the other 7%. By '52, rayon had carved out 72% (383 million lbs.), nylon, 2% (8 million lbs.), and cotton was down to 26% (138 million lbs.).

Last year, total tire-cord and fabric output in the U.S., according to the Census Bureau, was a mite short of 390.5 million lbs. Rayon had 69% of the market, with 248.3 million lbs.; nylon, about 23%, approximately 107.8 million lbs.; cotton was barely holding on with only an 8% share, less than 35 million lbs.

But tire-cord pound figures are open to misinterpretation. The drop in total tire-cord production—for example, from about 525 million lbs. in '55 to less than 390.5 million last year—doesn't mean that the number of tires produced is also dropping. Nylon cord provides greater strength in lesser deniers than does rayon: Du Pont figures 1 lb. of nylon is equivalent to 1.7 lbs. of rayon in a tire carcass.

Rayon, has, of course, also been strengthened over the years, resulting in less fiber being used in tires and contributing to reduction of the pound figure.

Last year, five major rayon producers* formed American Tyrex Corp. (now Tyrex Inc.) to promote Tyrex tire cord. Use of the new name, rather than "rayon," was intended to underscore the improvements that have gradually taken place in cellulosic yarns. Tyrex is claimed to be a "better viscose rayon tire cord . . . stronger, more durable, and cheaper per pound, than nylon."

Although Du Pont produces a "super-2" high-tenacity rayon yarn, it is not a Tyrex promoter. Two reasons: Du Pont insists that its own cord is "equivalent in properties to the best rayons being produced anywhere, including those rayons being sold under the Tyrex name"; and, perhaps more pertinent, Du Pont is all-out as a nylon backer.

(The impact that polyester fibers will have on the tire-cord market is still too tenuous to evaluate. Firestone Tire & Rubber's surprise revelation a few weeks ago that it was working with Dacron, Terylene and other polyesters also indicated there are no plans yet to produce a polyester fiber tire.

The other significant outlet for high-tenacity viscose is in belting—last year, about 4,000 tons, of which 2,500 tons went into V-belts and approximately 1,500 tons into flat belting. Use of rayon in this application is expected to grow steadily, but rate of growth may be slowed as newer synthetics (e.g., Dacron) achieve greater market acceptance. A '63 prediction: some 5,750 tons of rayon for belting and straps—a 450-ton increase over '59 consumption (*see table, p. 57*).

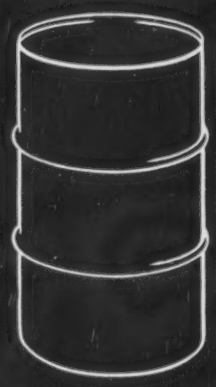
Generally, the over-all pattern of chemical wood cellulose use in rayon and acetate outlets registers the effects of boom and recession in automobiles and textiles, buffeting of the explosive growth of man-made noncellulosic fibers and the impact of newer plastics.

The pattern is clearly evident in rayon and textile acetate statistics compiled by *Textile Organon* (*see table, p. 59*). Demand for viscose filament (mostly tire cord), paralleling the auto output cuts of '58, slipped about 47,000 tons from the '57 level, while use of viscose staple, chiefly for clothing in blends with other fibers, dropped nearly 24,000 tons in the same period.

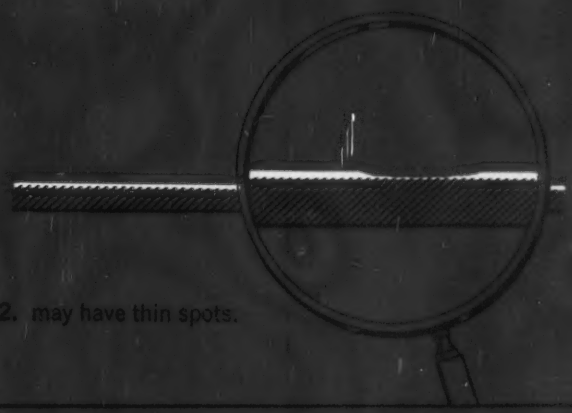
On the other hand, acetate filament consumption increased last year; acetate was a preferred fabric, because of its draping qualities, in the flash-fashion "sack" and "trapeze" styles. Acetate filament use has also edged higher with the soaring demand for filter-tip cigarettes. Chemical cellulose requirement for this latter outlet alone is currently estimated at 20-22,000 tons/year.

Plastics Plateau: Plastics' demand for cellulose acetate—approximately one-third that for textile outlets—has leveled off in the past couple of years, chiefly because of the encroachment by other plastics into once-firm acetate markets. For instance, a decade ago, toys and novelties accounted for about 11 million lbs. (20%) of cellulose acetate's plastics applications. Since

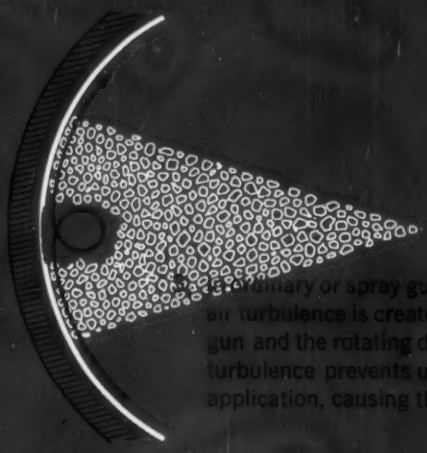
* American Enka, American Viscose, Beaunit Mills, Courtaulds (Canada), Industrial Rayon. Heading Tyrex is William Dalton, who is also president of American Rayon Institute.



1. The lined drums you buy



2. may have thin spots.



3. In ordinary or spray gun application, air turbulence is created by the spray gun and the rotating drum. Air turbulence prevents uniform lining application, causing thin spots.

4. Failures in thin spots allow your product to contact the drum steel, causing contamination, corrosion, customer complaints and costly losses.

5. Rheem Centrifugal Spray applies lining while drum is stationary; lining thickness is controlled to 1/10 mil. The result:

NO THIN SPOTS

in drums lined by

RHEEM CENTRIFUGAL SPRAY

And that's not all. For more than three years, Rheem Centrifugal Spray has been delivering lined drums free of pinholes, blisters, globs or skips. Air turbulence is eliminated. Human error is eliminated. Linings are cured by unique Rheem Vertical Curing in three stage, high temperature ovens. For more information, or help in developing a lining for a problem product, write the world's largest manufacturer of steel shipping containers at 1701 West Edgar Road, Linden, New Jersey. Plants across the country . . . Chicago, Houston, Linden, New Orleans, Richmond, Calif.; South Gate, Calif.; Tacoma. For other sales offices see the Yellow Pages.

Rheem

then, acetate products have virtually disappeared from toy counters. Dolls, once an almost exclusive acetate market, has been lost to vinyls; many novelties, hobby kits and other acetate preserves have been taken over by polystyrene.

Not long ago, about 6 million lbs. of acetate annually went into the manufacture of beads. That market has gone to polystyrene and polyethylene, although there are indications that the acetate is making a slight comeback at the expense of polyethylene.

But cellulose acetate is still a big factor in packaging films, magnetic recording tapes and as the base for photographic films, despite growing competition from polyester products such as Du Pont's Mylar and Cronar polyester photographic film base.

On the whole, cellulose acetate use in film, sheets, rods and tubes has been a minor factor, at least during the last four or five years, in the over-all slight uptrend in cellulose acetate plastics. Molding and extrusion products have become a far more important factor, taking about two-thirds of all cellulose acetate (and mixed esters) sold annually for plastics.

According to government statistics on cellulose plastics sales (which includes plasticizers, fillers and extenders), molding and extrusion materials in '54 accounted for 75.5 million lbs., compared with 35.2 million for the film, sheet, etc., category. By the end of '57, the ratio was 93 million lbs. vs. 43.2 million. Even with last year's economic downtrend and stiffer competition from other plastics (including the newer high-density polyethylene), total cellulose plastics sales managed to hold at about the '57 level.

It's doubtful that the plastics outlet took more than 90,000 tons of chemical wood cellulose last year, but trade experts predict that the '59 take will top 106,000 tons.

The optimistic outlook is inspired mainly by anticipated growth of relatively new acetate and butyrate outlets. Women's shoe heels, for example, which suddenly opened up a few years ago and shortly thereafter became a 4-5-million-lbs. market, may double that demand this year. Promising, too, are automotive applications, especially for stop light and directional signal light lenses. Acetate butyrate producers are also eyeing the vacuum-formed outdoor sign market—now mainly an acrylics province—as a "big time" potential.

Top Spot: Cellophane, the major flexible film, is one outlet that will continue to brighten the chemical cellulose end-use pattern. Last year, cellophane sales hit a record 403 million lbs., more than 100 million lbs. above output as recently as '54. In '60, pioneer U.S. producer Du Pont will come in with a fifth cellophane plant (at Tecumseh, Kan.; 50-million-lbs./year capacity), and this, added to productive capacity of the other large U.S. producers, American Viscose and Olin Mathieson, will nudge total capacity to about 500 million lbs./year.

Cellophane no longer has a clear field in packaging outlets because of growing competition from polyethylene, cellulose acetate, butyrate, etc.—and more recently polypropylene—but little significant letdown in use is expected. The baked goods market, for instance, is a prime target for polyethylene and other films, yet it remains the fastest-growing cellophane end-use; sales to bakers last year climbed 12% above '57's. About one-third of all white bread is now packaged in cellophane, as are practically all specialty breads.

About 30% of the cellophane consumed in the U.S. is for wrapping tobacco products, and recently introduced was a specially treated cellophane for prewrapped fresh meats.

Translated into cellophane's use of chemical wood cellulose (approximately 1.01 lbs. of cellulose is required to produce 1 lb. of cellophane), it means that production of the transparent film last year consumed about 201,500 tons; this year's requirements probably will be close to 222,000. And chances are that installed cellophane capacity—including Du Pont's new plant—will soon be inadequate to meet growth in demand.

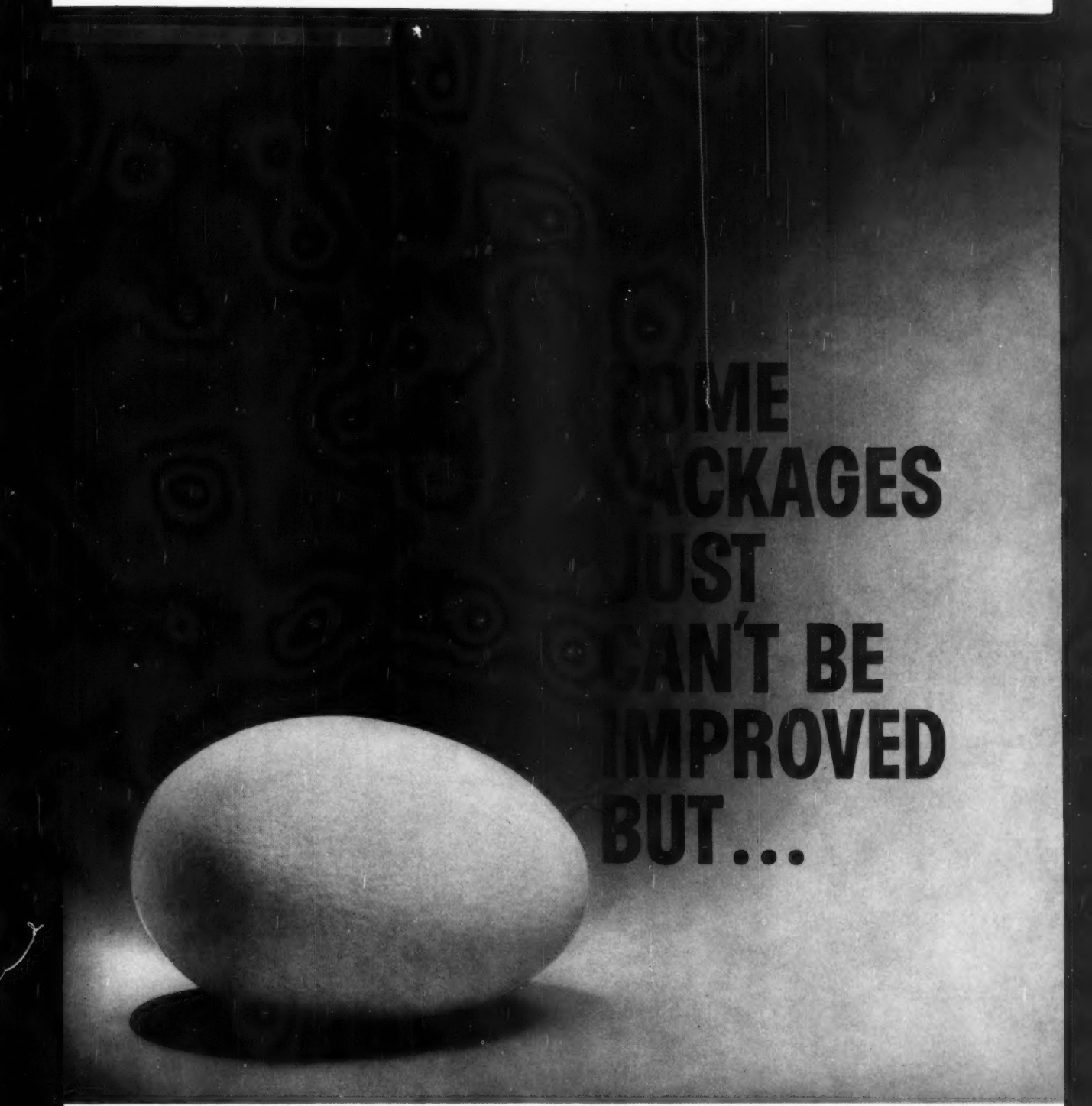
Even nitrocellulose, an old-time outlet, is taking on a new look as a potentially big solid rocket propellent. And improved plastics and lacquers continue to come from modified esters and mixed esters.

Research: And prodding intense chemical cellulose research is the low, steady price of the purified grades of dissolving pulp—there has been only one significant change in eight years (a drop in cellophane grade this year, *see table, p. 55*), plus high-tonnage availability.

One research effort is the approach to cellulose as a source of other chemicals. In working along these lines, the cellulose is destroyed by conversion into such compounds as glucose, levulinic acid, hydroxymethyl glucose, erythrose or glyoxal. These compounds, in turn, open possibilities in a broad range of organic chemical applications.

Such new uses won't materially affect the present or near-term demand for chemical cellulose, but the material's impressive list of established outlets alone should push U.S. consumption in '59 to more than 984,000 tons, nearly 100,000 tons higher than '58 demand (*see table, p. 57*).

It's a heartening outlook for producers of the ancient bulk chemical commodity that has, until now, received too little attention in world chemical markets.



. . . others can, and improving them is our specialty. Plax concentrates on packaging in plastics. We design and manufacture, in hundreds of shapes and sizes, plastic containers that squeeze, spray, pour, drip or "carry"—for foods, drugs, cosmetics, detergents and industrial liquids. Some examples of packaging designed by Plax for leading companies are shown on the pages following.

PLAX®

PLAX
GIVES A PACKAGE
A PLUS

YOU'RE IN THE BEST OF COMPANY...

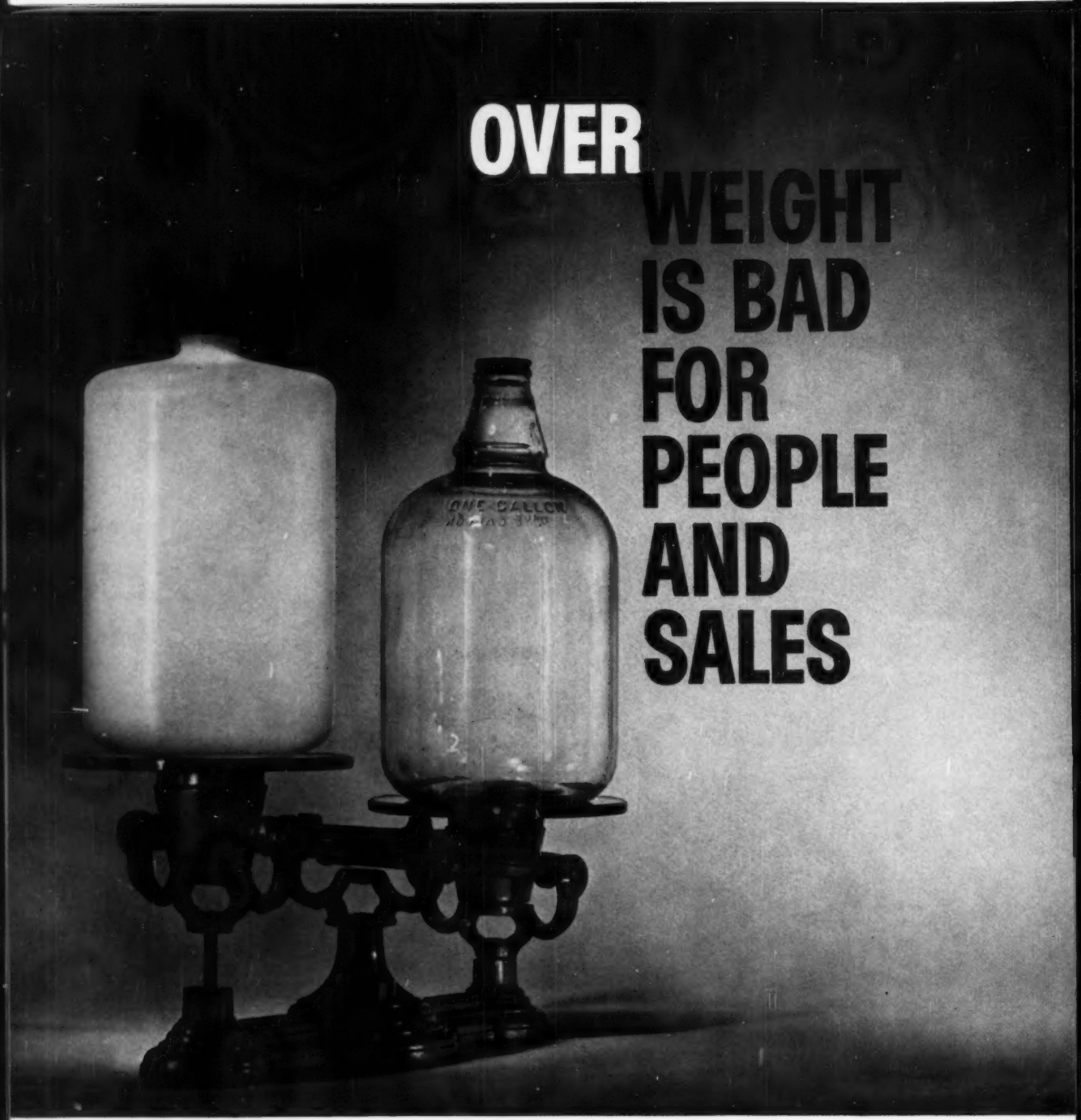
Today's plastic containers, properly designed and fabricated, are far more attractive, safer and easier to handle than glass or metal. More important, the modern touch of "squeeze-bottle" plastic can move your products off the store shelf quickly and profitably. Many companies, once doubters, are now enthusiastic users.

WHEN YOU USE PLAX CONTAINERS

The large staff of Plax designers and engineers, working with your specialists, can give your package unique styling and functional advantages. Plax is the foremost producer of plastic containers, with the largest manufacturing capacity in the industry.

PLAX

PLAX GIVES A PACKAGE A PLUS



For over 100 years, shippers have used heavy, old-fashioned glass bottles. The new square plastic 1-gallon container by Plax, shown here, weighs only 3 ounces —15 times lighter than the glass bottle it replaces! Startling savings in freight costs, too, and no breakage or disposal problems. Industry is buying them by the thousands for shipping a wide variety of liquids...
from chocolate syrup to sulfuric acid.

Plax Corporation, Hartford 1, Conn.
In Canada, Plax Canada Ltd., Toronto

PLAX

PLAX GIVES A PACKAGE A PLUS

Rules for explosive carriers differ widely in U.S. and abroad.

Dangerous-Cargo Hassle

Sharp international differences in dangerous-cargo regulations have for years been a cause of contention in world chemical trade. This week, the United Nations released a report that outlines the most controversial area in the distribution of hazardous chemicals — the packaging problem.

The report — a comparative study of packaging regulations for explosives and other dangerous articles in major Western nations — lays the groundwork for future meetings (tentatively scheduled for mid-1960) of The Committee of Experts of the Transport and Communications Commission (Economic and Social Council). At these meetings next year, the UN committee will attempt to resolve the conflicts and differences that make it difficult for foreign governments and shippers to compete for U.S. business in most dangerous commodities.

Regulated chemical products represent a sizable share of total chemical traffic. In '58, for example, hazardous materials accounted for approximately 35% of U.S. chemical exports. Principal products: dynamite and other explosives, paints, varnishes, lacquers, solvents, petroleum products, and a host of other industrial chemicals, specialties, and medicinal products.

Moreover, the volume and potential hazards of these materials are growing at a tremendous clip, keeping up with the development pace of new fuels, radioactive materials as well as increased movement of compressed gases, flammable materials and poisons.

Shipping Hazards: Most major trading nations have developed regulations for the safe transportation and distribution of hazardous materials. But these regulations are geared to each nation's specific needs and conditions.* Thus, they developed along lines dictated by the types of cargo carried, kind of transportation system in the nation, and — probably most important — by the accepted national philosophy of regulation.

Following World War II, the resurging European chemical industry, desirous of selling in this country, found that U.S. dangerous-cargo regulations imposed stringent and costly packaging, labeling and other shipping conditions on them.

Eyeing bigger U.S. sales and simpler shipping arrangements, foreign nations, led by Great Britain and France, pressed for UN action to bring some measure of uniformity on a global basis to the hodgepodge of individual national regulations.

UN Activities: Since the early '50s, the Transport and Communications Commission has pursued this goal with only a modicum of success. It operated through a committee of transportation and packaging experts chosen from member nations. The last of three meetings was held earlier this year in Geneva.

Members of the U.S. delegation, led by the State Department's Captain Robert Merrill, told *CW* that, so far, the UN committee hasn't really gotten down to basic principles, has wasted its time "in a ridiculous way" with all sorts of dodges, time-wasting maneuvers and behind-the-scenes activity. Object of this effort: to convince U.S. delegates that the detailed Interstate Commerce Commission and Coast

* For example, Britain's dominant maritime industry has developed regulations oriented to shipping needs; the U.S. developed its basic rules around the railroads.

Guard regulations must be relaxed to allow freer and simpler entry for foreign-made hazardous products.

The U.S. delegates insist that uniform worldwide regulations at least match U.S. standards, designed for minimum safety under U.S. conditions. As a result, only limited agreement has been reached so far on classification, labeling, and shipping papers.

Take the problem of classifying products by degree of hazard, for example. In Europe, dangerous products are often listed by groups, with similar materials included by analogy. Conversely, U.S. regulations are permissive, list each substance and do not permit movement of unlisted commodities except by special permit. Moreover, U.S. experts contend that foreign schemes of classification don't consider the relative hazards inherent in different container sizes, don't use exemptions to aid the shipper.

Lighter fluid (naphtha) in tank-car lots represents a fire and explosion hazard and is closely regulated in the U.S. The same material in 6-oz. cans poses a far less serious menace, say the U.S. experts, and U.S. regulations exempt the cans from many of the detailed rules.

Foreign regulations often ignore these facts, say the U.S. experts, fail to simplify matters for shippers of small quantities of dangerous products such as chemistry sets and small cans of paint or solvents.

Label Troubles: Language differences present labeling and handling difficulties in world trade. Confusion when mishandling dangerous goods could pose a hazard.

To cope with this stickler, the UN committee has developed 10 graphic diamond-shaped labels that portray the nature of the hazard pictorially.

But formulating these labels has been difficult. Cultural differences challenge the label designers to come up with unambiguous pictures. An umbrella was suggested to portray the warning 'keep dry.' But in India, this symbol means 'keep out of sun' or 'keep cool.' Suggestions to use a skull and crossbones on the radioactive materials warning label stirred indignant reaction among medical people.

Packaging Headaches: Most experts agree that the complexity of packaging poses the biggest obstacle to international agreement.

Packaging remains a prime target for cost cutting; hence, it is constantly changing. And the differences between our measurement system and the metric cause much difficulty.

Still another complication is the vast difference between American and European transportation and materials-handling systems and equipment. Small European rail cars (10-ton capacity) with pin couplings certainly don't impose the same packaging requirements that our larger, heavier cars do. And the lack of forklift trucks in many areas forces Italian workers to roll their drums of paint or alcohol. Result: they need heavy, 110-lb. drums, reinforced by steel hoops; in the U.S. a 50-lb. drum can be used for the same purpose.

Packaging experts around the world don't always agree on the approach to specific problems. Take compressed gases, for example. In British practice, cylinders are made of very brittle steel, several inches thick, and without safety outlets except on those for acetylene and carbon dioxide. Under intense heat, the cylinders have exploded. But British suppliers believe it's better to confine the gas at all cost, rather than let it escape.

American industry uses cylinder designs with thinner walls of a more ductile steel, equipped with one of several types of safety outlets. When one of these cylinders reaches dangerous pressures, the safety device opens to free the contents. Exception: highly toxic gases.

Performance Tests: In addition to detailed design specifications [i.e., explosives crates — stating number, length, and spacing of nails], U.S. regulations call for stringent performance tests. Outer packages, particularly, must pass an array of drop, puncture and leakage tests. Conversely, British packaging specifications are often more vague and general. A crate specification reads: "Crate should be of suitable make, effectively closed."

Although U.S. regulations are generally the most comprehensive and stringent in the world, there are exceptions. The European system of regulations governing rail transport (RID) makes a point of checking the chemical nature or purity of certain products (e.g., picric acid) before accepting them for carriage. ICC regulations don't always cover this

600 drums like this solved a problem...

When Swift and Company needed 600 decorated containers quickly for their new GOLD BEAR Pesticide plant in Memphis, they called on Southern States.

In 10 days, artwork was prepared and approved and 600 drums were delivered to Swift.

This is not a unique story. There's no waiting for drum delivery when you buy from Southern States. Drums to special specifications are turned out daily and on tight schedules.

Call on us and let us prove that our reputation for quality and service is well earned. We would like to add your name to our list of satisfied customers.

SOUTHERN STATES CONTAINERS

DIVISION OF REYNOLDS ALUMINUM SUPPLY COMPANY

2830 Fifth Avenue, North *SINCE 1914* Birmingham, Alabama

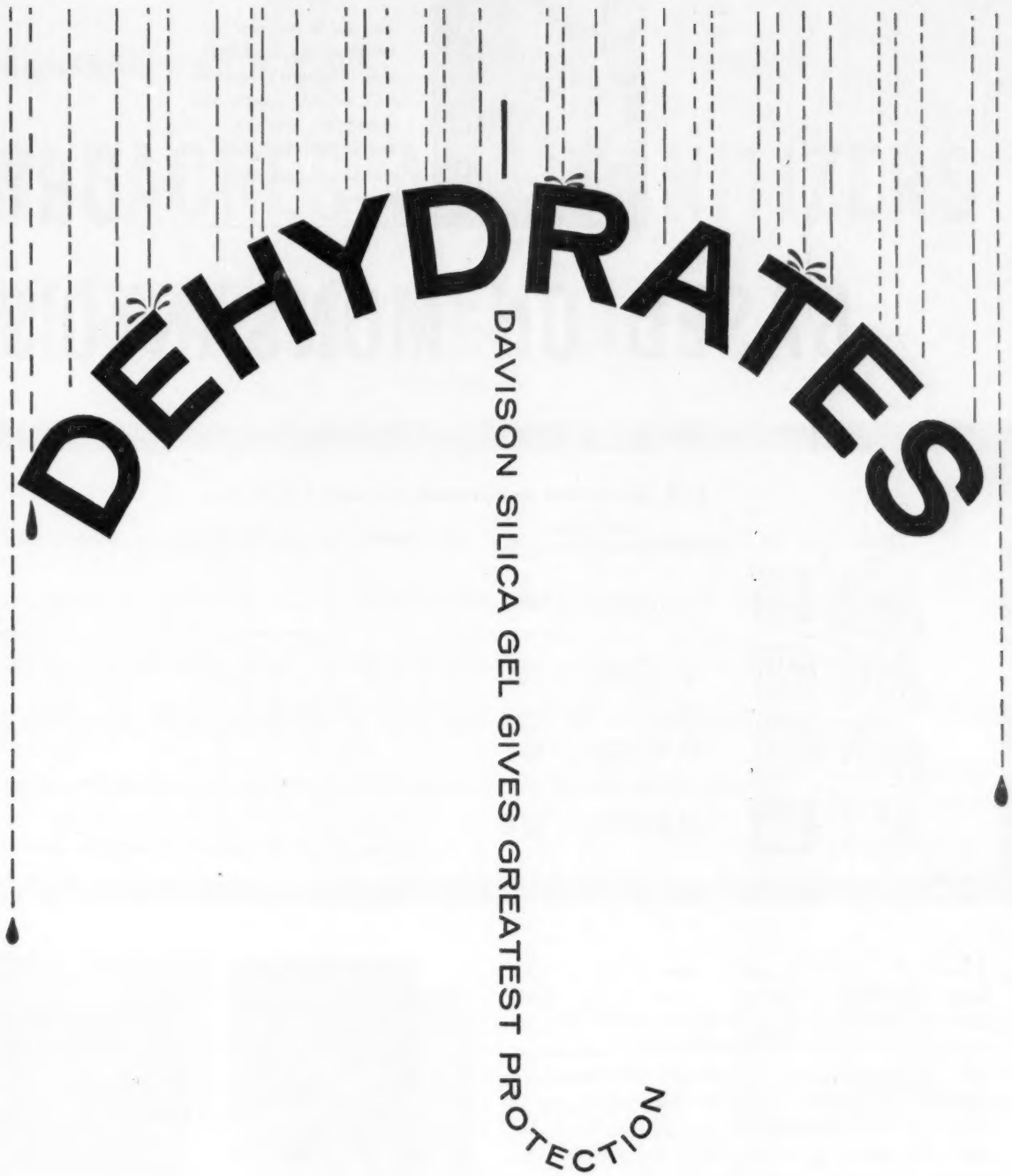
aspect. And in specifying the properties of some cushioning materials, ICC regulations omit the requirement that such material be fireproof, as some foreign regulations do.

Protective Regulations: Besides criticizing U.S. packaging regulations as unreasonably harsh and restrictive, foreign experts level another charge at the U.S.: American regulations, they say, are being used to protect certain industries that are vulnerable to foreign competition. Example: cylinders for compressed gases in the U.S. are made principally by two firms. But for strict ICC rules against foreign manufacture of these or of domestic use of foreign-made cylinders, both firms would have lost out years ago to the competition from overseas, say informed trade sources. Also objectionable to Europeans is the practice of specifying that tests must be performed in the U.S., using American methods and materials.

Agreement Prospects: With the most formidable obstacles still ahead, and with both European and U.S. delegations holding firmly that the other must yield, chances of any significant agreement within a few years seem slim. France's Louis Medard of Air Liquide told *CW* that his nation could never accept U.S. regulations as they are; compromise is necessary.

Today, many CPI companies, carriers and even representatives of the regulatory agencies are not fully convinced that international uniformity is an urgent need. But, some cost-conscious CPI shippers may eventually press for limited compromises in those areas where experience deems it wise. Meanwhile, the UN and 20 or so intergovernmental agencies will seek for avenues of agreement. Next UN attempt: adoption of package performance tests that would be acceptable throughout the world. Later, the UN will try to set up a 'pilot' standardization scheme involving those dangerous chemicals most actively traded.

Encouraged by the success of the International Air Transport Assn., whose regulations are effective in 49 member nations, the UN will keep talking. In any event, it may be a long time before the European chemical industry realizes its economic goal of increased hazardous-product exports to the U.S.



One cubic inch of Davison Silica Gel has an adsorptive surface of 90,000 square feet—an area larger than two city blocks! This capacity has made Davison Silica Gel the favored desiccant for air and gas dehydration and wherever rust, corrosion, or other moisture problems exist. For instance, Davison desiccants are used to protect tropical shipments, to clean and dehydrate air and natural gas—refrigeration systems—blast furnace gases—and in oxygen plants. Perhaps the application of a Davison desiccant to *your* moisture problems is in order. Write Department 3228 or call today for complete information.

DEPARTMENT 3228

W.R. GRACE & CO.
DAVISON CHEMICAL DIVISION
BALTIMORE 3, MARYLAND

You get lowest cost compounding flexibility with Monsanto's versatile ACL chlorine compounds, detergent phosphates, and SANTOMERSE and STEROX surface-active agents.

Immediate

DRY

BASED ON MONSANTO'S

ACL job-rated properties (where 1 is best)

	Available Chlorine (ave. %)		Solubility	Stability	Low Cost*
ACL 85	$(CINCO)_3$	90	3	3	1
ACL 70	$Cl_2H(NCO)_3$	70.6	4	3	2
ACL 60	$Cl_2Na(NCO)_3$	61	1	2	3
ACL 59	$Cl_2K(NCO)_3$	59.6	2	1	4

*based on cost per pound of available chlorine

Monsanto's versatile ACL line of chlorinated cyanuric acids gives you low-cost formulating "flexibility" to achieve the properties you want most. In nearly three years of commercial use, job-proved ACL compounds have stimulated sales of machine dishwashing products, chlorine scouring powders, industrial sanitizers and of dry bleaches for home and commercial laundries. With four ACL compounds, Monsanto can draw on this experience plus knowledge gained in five years of intensive research to help you formulate for new growth.

All four ACL compounds are ready for you now in quantity. If you make any bleach or sanitizing product—or are considering one of the many product opportunities in this field—you'll want to investigate what the ACL line can do. For a quick start, check the advantages described in the applications shown here. Then write on your company letterhead for working samples and technical help.

For household- and commercial-laundry dry bleaches, ACL compounds outperform older dry-type agents in efficiency, are safe for cotton and modern synthetic fabrics, do not cause pinholing. With ACL, you can market a dry bleach *fully equivalent* to sodium hypochlorite solutions in bleaching and sanitizing performance; and it's easier to store and ship, virtually mistake-proof to use.

For machine dishwashing compounds, ACL formulations are more stable and stay free-flowing longer than conventional dishwashing formulations. Fast-dissolving ACL works well with Monsanto's sodium tripolyphosphate to clean china safely and shine glassware without filming or water-spotting.

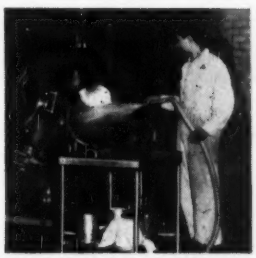
opportunities for profitable new sales.

BLEACHES AND SANITIZERS
VERSATILE ACL LINE

(available chlorine)

An ACL compound can deliver the one "best balance" of efficient available-chlorine action, solubility, stability, and economy for each dry bleach and sanitizing product you can make. New and improved dry products based on ACL offer you an immediate opportunity for fast, profitable growth in expanding fields.

For low-cost chlorine scouring powders, you can use more functional fillers in formulations based on ACL than in those based on less concentrated chlorine carriers. And packaged ACL formulations lump and cake less under varying temperature and humidity.



For industrial sanitizing compounds, ACL gives you the most formulating flexibility of all dry-type available-chlorine carriers—greater safety, convenience and ease of storage than liquid sanitizers. ACL sanitizers with detergent properties are used in dairies (see photo), food processing plants, hospitals.

ACL, SANTOMERSE, STEROX: Monsanto T. M.'s Reg. U. S. Pat. Off.

For more details use the convenient coupon

Monsanto

Monsanto Chemical Company
Inorganic Chemicals Division
Dept. 91-A, St. Louis 66, Missouri

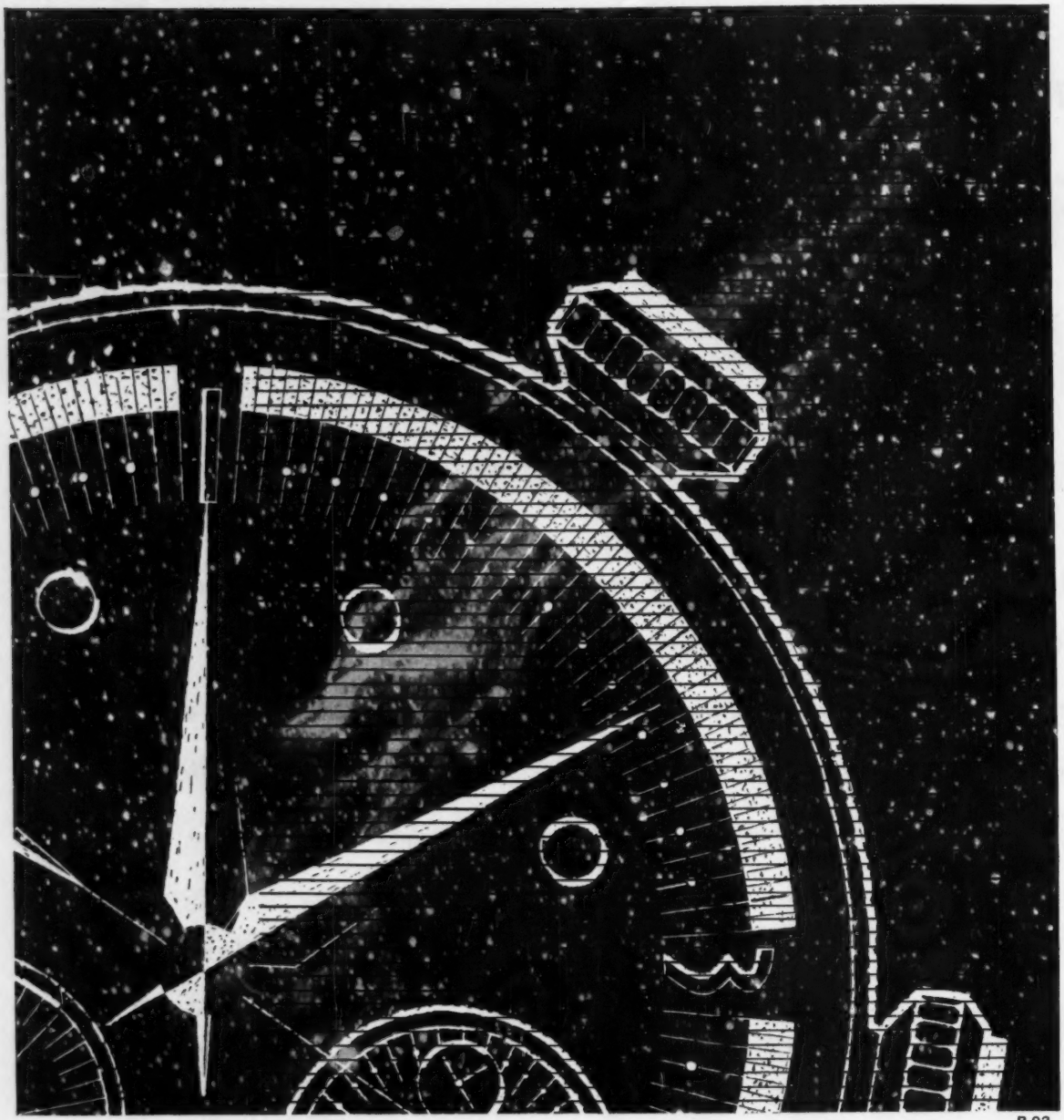
Please send me technical literature on ACL.

Name_____

Company_____

Address_____

City_____ Zone_____ State_____



B-92

TIME* another laboratory ingredient available when you look to Fisher for laboratory needs

FISHER SCIENTIFIC

IN THE U.S.A.			IN CANADA
Boston	Chicago	Philadelphia	Edmonton
Buffalo	Cleveland	Pittsburgh	Montreal
Charleston, W.Va.	Detroit	St. Louis	Toronto
	New York	Washington	

America's Largest Manufacturer-Distributor of Laboratory Appliances & Reagent Chemicals

**Example: at J&L Steel Corp., a Fisher-Gulf Partitioner (pat. pending) cuts 4-hour gas analyses down to 15 minutes.*

Sighting New Cures for Fungus Ailments

Tennecetin, new pacesetter in research for better fungus-fighting drugs, is heading for production this week at S. E. Massengill Co. (Bristol, Tenn.). The latest thing in antibiotics, tennecetin is a broad-spectrum drug, features antifungal rather than antibacterial activity.

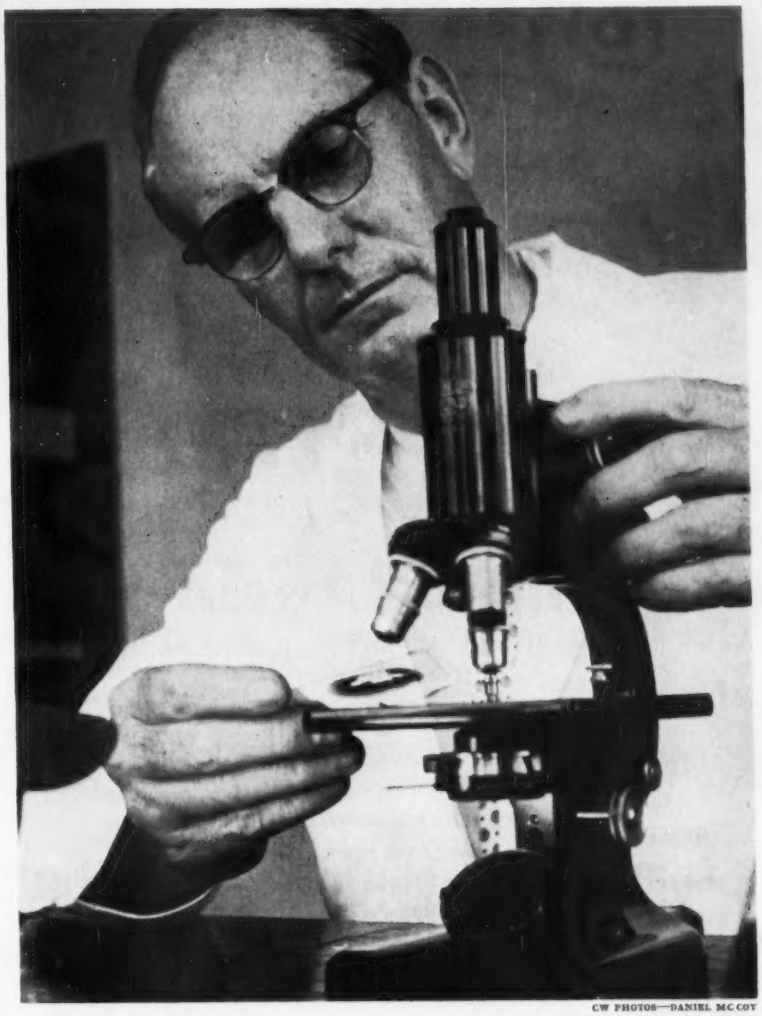
Massengill, like a clutch of other pharmaceutical houses, is putting new emphasis on finding better antifungals because, with widespread use of antibiotics for bacterial infections, fungus infections have become an increasingly important medical problem.

Tennecetin was turned up by D. Frank Holtman and James Burns at the University of Tennessee (Knoxville) department of bacteriology and by Massengill's Fred Barr. More than 80 different species of fungi fell prey to tennecetin in lab tests, and Holtman reveals that "no yeast or mould has yet been found that has not been inhibited by this antibiotic." It has also been successfully tested clinically against scalp, vaginal, foot and other fungus infections.

But tennecetin may not be the final answer to the bothersome, sometimes fatal, fungus forms. That's because it's best applied topically — and researchers are plugging for compounds that can be taken orally or by injection. Tests show that tennecetin is toxic to test animals when injected, although it "did not result in the appearance of toxic symptoms" when taken by mouth, according to Barr.

The big problem, as seen by Massengill's research director, Bernard Brent, is to find an antibiotic that is both specifically antifungal and suitable for internal use. Massive doses of antibacterial antibiotics often cause rapid increase in internal fungi (e.g., in the intestinal tract) while overwhelming infectious bacteria. However, Brent sees tennecetin as a step forward because "very few antifungal antibiotics are known today." Nor is he worried about the imminence of fungi developing immunity to tennecetin, because "we have been unable to grow an immune strain of fungus in the lab."

Penicillin a Parent: The first commercial oral antifungal antibiotic is



CW PHOTOS—DANIEL McCOY

U. of Tennessee's Holtman unearthed profitable new streptomycete. Holtman, Massengill's Barr and Tennessee's Burns probe tennecetin.

griseofulvin, a fermentation product of four *Penicillium* species. It is used orally to combat skin infections such as "athlete's foot," "barber's itch" and scalp "ringworm." Schering Corp. (Bloomfield, N.J.) entered the antibiotics field last month with this product marketing it under the tradename Fulvicin.

Griseofulvin, however, isn't new—only its use as an antifungal in human beings is novel. It was discovered in 1939, and patents on the product were obtained by England's Glaxo Laboratories.

Early research on effect of the drug was on plants—orchids, tomatoes, wheat and others. But last November, the first use of griseofulvin in human beings was reported at the meeting of the Austrian Dermatological Society in Vienna. Schering and other U.S. companies became interested, and Schering says its subsequent clinical trials have been encouraging.

Fulvicin, Schering says, is fungistatic, rather than fungicidal—it prevents the growth of fungi, rather than killing them directly. Exactly how it works isn't known, but it is believed to work its way to the skin, when taken orally, rendering the skin's keratin unsuitable as a host for fungi.

Many major drug firms are researching fungus fighters, often on a routine screening basis. There's incentive, not only in tough-to-treat systemic fungal infections but also in the prevalence of superficial infections. Parke, Davis estimates that at least 5% of all persons* have some type of fungus infection during their lifetime. It, unlike some firms, sees the market for new drugs as mostly for those that can be used topically.

Ciba discloses that about 15% of its research in the antimicrobial area is in fungicides and antifungals. The firm includes 5-chloro-7-iodo-8-hydroxyquinoline (Vioform) alone, and in combination with hydrocortisone, among products in its antifungal arsenal.

Ciba introduced Vioform in 1897, isn't grooming any immediate successor to the durable drug. But a new Ciba antihypertensive drug, guanethidine, has shown some antifungal value. Ciba has two antifungals in

* During World War II, 0.83% of Army personnel, 0.57% of Navy personnel reported fungal infections.

Everyone under the sun uses Cellulose

These people are having too much fun to think about cellulose. But, if they only knew:

Those swim suits will retain their shape and color better because they're made from acetate and viscose rayon, both products of cellulose. The radio and eyeglass frame are lighter and more colorful, thanks to shock-resistant cellulose plastics. Even the frankfurter has a cellulose casing and the camera uses film with a cellulose base for clear, sharp photographs. Cigarette filters, cellophane, rayon cord tires, rayon fabrics and countless other products also depend on cellulose.

As industry's oldest producer of this versatile material, we're proud of our record as pioneers in cellulose. And pioneering never ceases at Buckeye. Through continuous research in cellulose, we are helping industries to develop new products and make existing ones better.

Let us know how we can become a working partner in your endeavors involving the use of cellulose. *Just call Buckeye . . . the nation's only producer of high alpha cellulose from both cotton linters and wood.*

BUCKEYE CELLULOSE CORPORATION
MEMPHIS 8, TENN.
Cotton linters plant at Memphis, Tenn.
Wood pulp plant at Foley, Fla.

BUCKEYE CELLULOSE:
Basic ingredient in many remarkable products

Buckeye
first in cellulose

clinical tests, also offers the antihistamine Pyribenzamine for use in fungus-related skin ailments.

Where to Look: Just as the market for antifungals is big, but hard to peg, the chemical or antibiotic families that are most likely to yield new antifungals are difficult to predict. There's no consistent trail to follow in this research.

Tennecetin was isolated from a streptomycete (found in Tennessee soil) that does not appear to be identical with any previously described organism. Holtman and his colleagues named it *Streptomyces chattanoogensis*. The drug has not yet been chemically characterized its developers say.

Furthermore, experimental antifungal drugs vary widely in composition. Examples culled from the literature include: alkylmercurithiosalicylic acid esters (Japanese Patent 4117 to Kaken Chem Co.); chlorinated *o*-dimethylaminopropylamino diphenyl sulfide and derivatives (reported by University of Virginia researchers); mycobacillin, a cyclic polypeptide, turned up at the University College of Technology's (Calcutta, India) department of applied chemistry; a fungistatic steroid, 3-β-methoxy-5-androsten-16-β-ol (University of Oklahoma School of Medicine, Oklahoma City); and a series of bis-quarternary diamines derived from β-ionine and its analogs synthesized by Hoffmann-La Roche.

Plenty of Variation: Even commercial antifungants vary widely. The G. F. Harvey Co., Inc. (New York), among others, markets Fungacetin (glyceryl triacetate), a potent topical antimycotic stemming from research at Wisconsin Alumni Research Foundation. Wallace & Tiernan, Inc. (Belleville, N.J.), which is putting about 50% of its research effort into antifungals, offers Desenex (based on undecylenic acid), among other antimycotics. Both these preparations are marketed as treatments for control of "athlete's foot."

Although antifungal research is largely empirical, it is a sizable effort that's getting bigger. Teeming populations are falling easy victims to the seemingly interminable array of fungus diseases. And, drug men calculate, they're also an avid market, hoping still better fungus cures will come along.

RESEARCH

Research Cost Split

Union Carbide Metals Co., division of Union Carbide Corp., and the Atomic Energy Commission will split the estimated $97,450 cost of new fundamental research into the nature of metallic solid solutions. Object of the program, which will be carried out by Carbide, is to come up with a more comprehensive "theory of alloys," thereby strengthening what the company calls "one of the weakest parts of the science of metals." Three basic tools will be used in the study—electron transport, X-ray diffraction and nuclear magnetic resonance.

EXPANSION

• Construction of a building to house the Union Carbide Research Institute is scheduled for completion by late '60. The institute was formed in '56 to extend the scope of Union Carbide Corp.'s basic research. Its new building will be located on a 280-acre site at Eastview, near Tarrytown, N. Y.

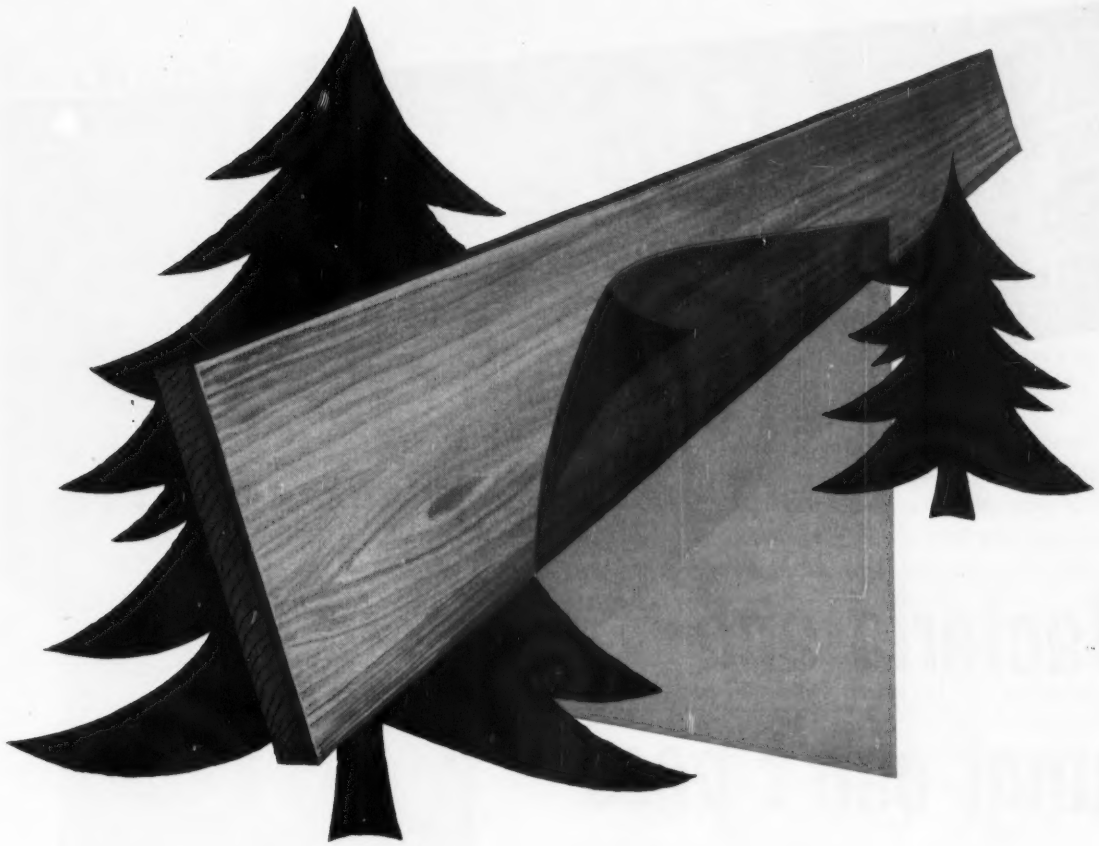
• Dewey and Almy chemical division of W. R. Grace & Co. is completing its new Polyfibron (polymers-fibers) laboratory at Cambridge, Mass. The lab contains pilot-scale facilities for making, impregnating and coating papers.

• B. B. Chemical Co., subsidiary of United Shoe Machinery Corp., has expanded its service laboratory facilities at Cambridge, Mass., for adhesives studies and testing. B. B. makes industrial adhesives, coatings and sealants marketed under the tradename Bostik.

• Foote Mineral Co. has broken ground for its new, $2.2-million research and engineering building near Exton, Pa.

• Vitro Engineering Co., division of Vitro Corp. of America (New York), will design and engineer a $1.7-million high-level-radiation laboratory for the U.S. Naval Research Laboratory (Washington, D.C.). The lab will be used to study radiation effects on the construction materials of nuclear-powered vessels.

• Shell Chemical Corp.'s synthetic rubber division research lab at Torrance, Calif., is installing a 13-ton, cobalt-60 irradiation unit for use in development of radiation-resistant products.



Another success story of Shawinigan acetal resins
wood sealers

Shawinigan Resins' Butvar (polyvinyl butyral) and Formvar (polyvinyl formal) are used in sealers for pine lumber to prevent bleeding of knots, resin ducts, and heartwood. The sealers restrict bleed-through of terpinaceous matter which causes embrittlement and discoloration of topcoats particularly evident on white or light colored trim. In addition to their excellent sealing action, Butvar and Formvar based sealers give outstanding intercoat adhesion, holdout and build.

This is just one illustration of how acetal resins are being used to advantage in industry. These versatile resins might be the answer to your product improvement problem.

Polyvinyl acetal resins, Butvar and Formvar, are unusual polymers because they contain three different functional groups distributed in the molecular chain. Available in a variety of molecular weights and chemical compositions, the acetal resins are compatible with a wide range of resins and plasticizers. This variety of grades allows users great flexibility in the choice of solvents.

Under suitable conditions Butvar and Formvar are reactive with phenolics, melamines and other thermosetting resins, and, even in fairly minor quantities, impart significantly improved adhesion, toughness and flexibility. Why not put these unique properties to work in your product. We'll be glad to help. Write for full information and product literature to Shawinigan Resins Corporation, Dept. 1134, Springfield 1, Mass.

Shawinigan does not produce wood sealers . . . we supply acetal resins which make them possible.

SALES OFFICES: ATLANTA CHICAGO LOS ANGELES
NEW YORK SAN FRANCISCO

FORMVAR® *polyvinyl formal and*
BUTVAR® *polyvinyl butyral resins by*

SHAWINIGAN RESINS ®

Bacteria and fungi can't pass this protector!

Tris Nitro—Tris(hydroxymethyl)nitromethane—stops fungi and bacteria *dead!* Ideal in cutting oils, oil well flooding, pipe lines and drilling muds—checks unwanted microbiological growth in aqueous systems. Prevents deterioration of non-protein sizing and adhesive solutions during storage. Just 0.1% Tris Nitro safeguarded cutting oil system free of bacterial contamination for over 60 days during recent test—longer than any other compound tested!

The success of Tris Nitro is due to the slow release of bactericidal and fungicidal decomposition products, including formaldehyde. Tris Nitro offers sustained protection for extended periods with no indication of development of resistance. Recent experiments show that formaldehyde is also released at high humidities and high ambient temperatures in the presence of a trace of alkaline material. Tris Nitro is a powerful inhibitor of microorganisms, and in dry form should be evaluated to protect packaged goods from mold attack during shipment and storage.

PHYSICAL PROPERTIES

Formula	$(CH_2OH)_3\ CNO_2$
Molecular Weight	151.12
Melting Point, °C	165-170d
pH of 0.1M Aqueous Solution	5.6
Solubility in Water g/100 ml at 20°C	220

For Technical Data Sheet No. 29 and sample, write CSC today.

INDUSTRIAL CHEMICALS DEPARTMENT

COMMERCIAL SOLVENTS CORPORATION

260 MADISON AVE., NEW YORK 16, N. Y.

Atlanta • Boston • Chicago • Cincinnati • Cleveland • Detroit • Kansas City
Los Angeles • New Orleans • Newark • New York • St. Louis • San Francisco
IN CANADA: McArthur Chemical Co. (1958) Ltd., Montreal • IN MEXICO: Comsolmex, S. A., Mexico 7, D. F.

Technology
Newsletter

CHEMICAL WEEK
August 29, 1959

A new family of ultrahigh-temperature metals for missiles has been developed jointly by Stauffer-Temescal (Richmond, Calif.) and Aerojet-General (Sacramento, Calif.). They're alloys of tantalum and tungsten, provide the highest-known melting points (5430-6150 F) of any material except rhenium. And they provide outstanding high-temperature strength —close to 15,000 psi. at 4500 F—that's important to top performance of high-thrust rocket motors.

Key to new alloys is Stauffer-Temescal's electron-beam melting and casting process (*CW, March 3, p. 39*), which turns out high-purity ingots 5 in. in diameter and up to 42 in. long. Because the new metals can be worked by conventional metal-working equipment and scrap can be recycled directly through the electron-beam furnaces, finished tungsten-tantalum components are said to be relatively low in cost.

•

"Quick, accurate, around-the-clock check of air pollution in chemical plants is provided by a mobile miniature spectographic laboratory." reputedly the first of its kind. National Spectographic Laboratories (Cleveland) developed the unit, recently installed it in a Midwest nuclear components plant where it monitors air-borne beryllium oxide. A test was completed in 70 seconds. A red light and horn signal the presence of contamination above the safe level. The custom-built unit sells for around $10,000, is also expected to be useful to producers of such items as paint, insecticide, and silicon metal.

•

A major study of the toxicology of materials for packaging supplied to food packers by Hercules Powder has been set up by the firm. Cost: $500,000. The program, developed with the guidance and cooperation of the Food & Drug Administration, will be conducted by the Industrial Bio-Test Laboratories, Inc. (Northbrook, Ill.). Said Hercules Vice-President Paul Mayfield: "Safety to the consumer in any of these products has never been questioned, but under the new food additives amendment, safety must now be formally proved in accordance with exact and detailed specifications of the law if use of these materials is to continue." Hercules markets about 50 types of resins used in packaging.

•

"Flameless fusion"—a new crystal-growing technique disclosed last week by International Telephone & Telegraph Corp.—is turning out large-size ferrite monocrystals. The key: induction heating of a specially prepared mixture of ferric and other oxides to the 2000 F temperature required for the thermochemical crystal-forming reaction. Unlike conventional gas-burning processes, which yield impure crystals, the new method avoids contamination—the oxides flow through a glass tube surrounded by a ring charged with high-frequency radio energy.

Newest nuclear reactor concept is a sulfur-cooled system to be studied by Aerojet-General Nucleonics (San Ramon, Calif., subsidiary of Aerojet-General Corp.) under an AEC contract awarded this week. AGN's David Sawle conceived the idea, using boiling sulfur at about 1200 F as both coolant and working fluid. The idea looks most promising for a graphite-moderated system, is expected to give a substantial increase in thermal efficiency—potentially to as high as 50%—with resultant savings in fuel and operating costs.

•

Things are happening in pesticides this week:

• Close on the heels of its decision to boost thiol (*p*-chlorothiophenol) production by about 50% at Henderson, Nev., Stauffer Chemical disclosed that it has quietly been testing a new thiol-derived pesticide for about a year. The new product is the methyl analog of trithion (o,o-diethyl S-*p*-chlorophenylthiomethyl-phosphorodithioate), which has gained wide acceptance in the past two years. The company has also tested a number of other trithion analogs, says that methyl trithion looks quite promising but will require two to three years of testing before conclusive results are in.

Goal of the buildup of thiol production is the integration and expansion of trithion output. The move reportedly involves the installation of a new process that will provide twice the capacity of the present processing operation. With the completion of the new unit in January, Stauffer will convert thiol facilities at its Niagara Falls, N.Y., plant to other uses.

• A pesticide that kills few beneficial insects is reported to be performing well in tests at the University of California. It's Dylox (dimethyl trichloro hydroxyethyl phosphonate), made by Chemagro (St. Louis, Mo.). The California experimenters report that low to moderate dosages of Dylox are only slightly toxic to aphid-destroying lady beetles, that its low toxicity to honeybees permits its use on alfalfa seed corps while the fields are in bloom.

•

Three big, new linear accelerators will be built this year by Applied Radiation Corp. (Walnut Creek, Calif.) for sale to Rensselaer Polytechnic Institute, Yale and University of California's radiation center at Livermore. The new accelerators will be the biggest so far offered commercially. One size offered will have a beam power of 28 kw., maximum energy of 45 mev.; another will be 48-kw., 35-mev. High power ratings are said to be made possible by a lower frequency than other linear accelerators (1,300 vs. 2,800 megacycles). Each unit will cost about $1 million, is expected to be ready for delivery early in '60. Although these units are intended for research, Arco believes that machines of similar size have potential application for radiation processing.

Softness sold this towel...

and CARBIDE's amines gave it that softness

Textile softeners, based on CARBIDE's amines, give linens and cottons the softness that makes them sell. And, with the complete selection of amines available from Union Carbide, you can make textile softeners that give the right kind of softness for best sales appeal in finished goods. Cationic mill-softeners, prepared by fatty acid esterification or amidification of CARBIDE's amines, offer a full range of softening effects. Here are seven amines for your evaluation:

- Triethanolamine
- Diethanolamine
- N-Aminoethyl Ethanolamine
- N-Methyl Diethanolamine
- Diethylene Triamine
- Dimethylamino Propylamine
- Diethylamino Propylamine

Remember, whether you need amines . . . UCON textile lubricants . . . anti-foaming agents for scouring and mercerizing . . . water-insoluble solvents to achieve deeper and fuller shades in dyeing . . . monomers for fiber syntheses . . . ethanolamines and TERGITOL nonionic surfactants for detergents . . . or other organic chemicals for finishing agents and lubricants . . . you'll find them at CARBIDE. With more than one hundred CARBIDE textile chemicals to choose from, you can take advantage of the increased savings of bulk buying in mixed tank car and mixed tank truck lots, or mixed carload lots in drums.

For information and help from experienced Technical Representatives, call your nearest CARBIDE sales office or write to: Union Carbide Chemicals Company, Room 328, Department HW, 30 East 42nd Street, New York 17, N.Y.

UNION CARBIDE CHEMICALS COMPANY

DIVISION OF UNION CARBIDE CORPORATION

The terms "Tergitol", "Ucon" and "Union Carbide" are registered trade marks of UCC.

New through FLUIDICS *

ULTIMATE WATER

20,000,000 ohms resistance—makes distilled water seem salty

To rinse a transistor clean of all contaminants you need a water cleaner than the cleanest that ever fell from the sky.

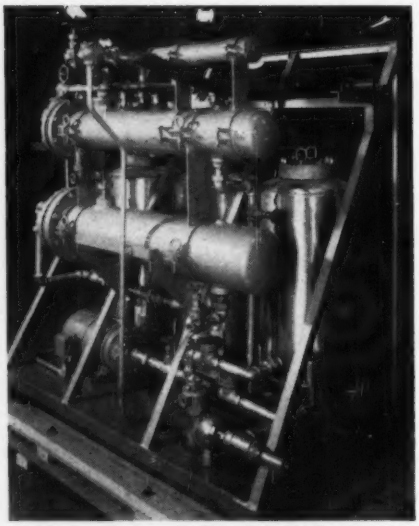
Such water we call *ultimate water.*

Ultimate water makes the chemist's distilled water seem almost salty. Compared to it, ordinary drinking water seems almost solid with dissolved minerals, salts, suspensions, and similar impurities.

Acts like insulator. Ultimate water is so clean that you have to measure its purity by its resistance to electricity. Ordinary tap water makes a pretty good conductor because of the impurities it contains. Its resistance runs from 1,000 to 10,000 ohms. Ultimate water has a resistance of up to 20,000,000 ohms and acts more like an insulator than a conductor of electric current.

New Permutit equipment. As government and industrial specifications pinch tighter and tighter, you may well find a need for ultimate water in your processing. Whatever your water conditioning requirements, you'll find Permutit has developed equipment to give you the kind of water you need in the quantities you want, economically.

If you'd like to know more about ultimate water or water treatment in general, write to our Permutit Division, Dept. CW-89, 50 West 44th Street, New York 36, N. Y.



Ultimate water is produced at 10 GPM in this pre-assembled, skid mounted package called the Permutit Ultimate Demineralizer Unit.

FLUIDICS AROUND THE WORLD

Pfaudler Permutit is a world-wide company with manufacturing plants in:

Germany: Pfaudler-Werke A.G.
Great Britain: Enamelled Metal Products Corp. Ltd.
Canada: Ideal Welding Co. Ltd.
Mexico: Arteacero-Pfaudler, S.A.
Japan: Shinko-Pfaudler Co., Ltd.
as well as four plants in the U. S. A.

*FLUIDICS is a Pfaudler Permutit program that provides a modern, imaginative approach for handling and processing liquids and gases more profitably.

PFAUDLER PERMUTIT INC.
SPECIALISTS IN FLUIDICS... THE SCIENCE OF FLUID PROCESSES

Budget Boosts Signal New Reactor Goals

Now that the annual skirmish with Congress is out of the way, the Atomic Energy Commission is turning its attention to carrying out a $2.5-billion program in fiscal 1960. One of the major changes was the dropping of fluid-fueled reactor concepts—largest single item of the '58 and '59 civilian power reactor programs—and the reorientation of activities in these areas toward a new long-range goal of thermal breeder development.

Though thermal breeders aren't expected to be pushed for early economic operation, the prospects of their eventual success forces chemical processors to consider the long-range effect on nuclear fuel processing operations.

Main reason: thermal breeders will be fueled with thorium, which is more plentiful—though generally less concentrated in ores—than uranium, therefore involves more complicated recovery processes.

The thorium - uranium - 233 fuel cycle has long been acknowledged by the experts as the best one for thermal reactors, which are most likely to achieve economic power generation in the immediate future (*CW, April 27, p. 94*). But emphasis on pressurized-water and boiling-water reactor systems, coupled with inherent operating problems (corrosion and erosion) of thorium-fueled reactors, have forced thorium to take a back seat. For example, AEC expects to reach its goal of a limited thorium stockpile (about 2,000 tons) during the next fiscal year, contemplates no further purchases.

But all this could change. Today, there are stirrings in thorium-processing technology which indicate that thorium development is by no means dead.

Oak Ridge Project: Primary responsibility for the long-range thermal breeder program has been assigned to the Oak Ridge Operations Office. The lion's share of the reduced budget for fluid fuel reactor development ($5 million of the total $7.5 million) is earmarked for the continuation of aqueous homogeneous reactor development, reoriented toward the ther-

AEC's operating budget request tops $2.5 billion.

	fiscal '58 (actual)	*fiscal '59 (est.)*	*fiscal '60 (est.)*
	(millions of dollars)		
Raw materials	$598.5	$702.1	$738.6
Special nuclear materials	567.7	545.0	568.0
Weapons	433.0	480.0	495.0
Reactor development	309.0	342.0	407.4
Physical research	90.6	119.0	153.3
Biology and medicine	35.3	43.2	49.0
Training, education and information	15.4	13.7	14.8
Civilian uses of isotopes and nuclear explosives	0.4	5.7	14.1
Community	17.7	16.8	15.6
Program direction and administration	45.9	49.8	52.0
Security investigations	7.6	7.5	7.4
Other costs	8.5	6.6	5.7
Revenues applied	—32.7	—28.7	—31.4
Obligations incurred for costs of other years	77.3	36.4	60.9
Total	**$2,174.2**	**$2,339.1**	**$2,550.4**

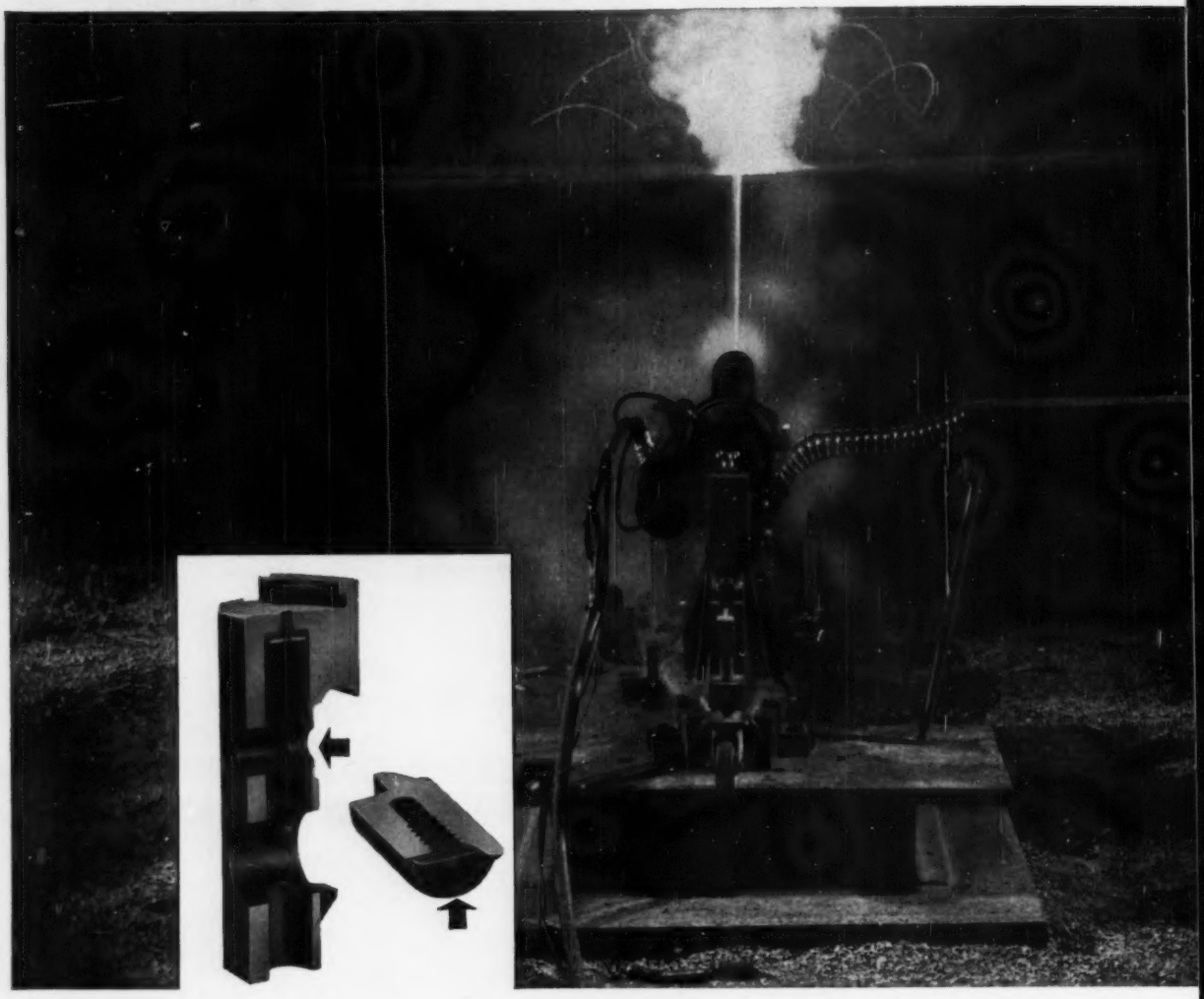
Reactor development accounts for biggest increase.

	fiscal '58 (actual)	*fiscal '59 (est.)*	*fiscal '60 (est.)*
	(millions of dollars)		
Civilian power reactors*	$78.1	$90.2	$109.7
Design and engineering studies	1.1	1.5	5.0
Euratom	0	0	5.0
Reactor systems research and development	13.4	14.8	17.7
Fuel-cycle development	0	6.0	13.0
Reactor safety	6.4	5.5	9.7
Separations systems development	7.5	5.2	6.0
Radioactive residues management	3.0	3.2	4.5
Merchant ship reactors	1.5	4.8	6.0
Army power reactors	5.4	9.1	11.0
Naval propulsion reactors	90.2	86.0	90.0
Airplane propulsion reactors	62.2	65.8	68.7
Missile propulsion reactors	12.1	21.0	27.9
Satellite power sources	3.4	7.5	12.1
Operational services	5.9	3.4	1.3
Equipment	18.8	18.0	19.8
Total	**$309.0**	**$342.0**	**$407.4**

*See table on p. 91.
Source of tables: AEC amended budget request as contained in House document number 179.

3M COMPANY CHEMICALS

THE RAW MATERIALS OF PROGRESS



KEL-F® PLASTIC HELPS TRIGGER FASTEST

6000 rounds per minute! That's the sting of the Vulcan—new 20mm aircraft cannon produced at the General Electric Company's Missile Production Section, Burlington, Vermont, with a big assist from 3M KEL-F Brand Halofluorocarbon Polymers.

Vulcan is electrically fired. Hence, its bolt and pin must be insulated. KEL-F Plastic met the rigid criteria for the firing pin liners because it is oil-resistant, has extremely favorable high-temperature properties, including a low coefficient of expansion. KEL-F Plastic was specified for these reasons, and also because it is easy to mold.

KEL-F is a Reg. T.M. of 3M Co.

The plastic gates through two small orifices . . . must meet tolerances as close as .001"—an extremely difficult molding job made easier by KEL-F Plastic's moldability. Yet, the KEL-F Plastic liners (see arrows in inset) perform well under the exacting specifications demanded, the extreme temperature ranges encountered. Liners molded by G-W Plastic Engineers, Inc., Bethel, Vermont.

When tough insulation problems have you up in the air, remember KEL-F Polymers. They are finding increasing use in missiles, rockets and aircraft applications. Their performance characteristics are yours for the asking.

CHEMICAL DIVISION

MINNESOTA MINING AND MANUFACTURING COMPANY

. . . WHERE RESEARCH IS THE KEY TO TOMORROW

3M COMPANY

Civilian power reactor spending is cut for fluid fuels, is boosted for other concepts.

	fiscal '58 (actual)	*fiscal '59 (est.)*	*fiscal '60 (est.)*
	(millions of dollars)		
Pressurized water	$17.5	$17.0	$20.0
Boiling water	3.7	4.0	8.2
Fluid fuel	21.4	19.7	7.5*
Fast power breeder	7.4	10.3	12.1
Sodium-graphite	7.2	6.5	8.8
Organic moderator	5.1	2.8	5.8
Plutonium recycle	3.5	4.8	5.0
Heavy water	1.9	3.8	6.2
Gas-cooled power	2.5	5.0	9.5
Advanced design studies	0.7	1.1	2.0
Experimental fabrication	0	0	5.0
Cooperative program	7.2	15.2	19.6
Total	$78.1	$90.2	$109.7

*New thermal breeder program.

mal breeding program's objective.

Oak Ridge National Laboratory Director Alvin Weinberg views the commission's action as a confirmation of the laboratory's confidence in the aqueous homogeneous system's chances of eventual success.

Though such other reactors as the molten-salt and heterogeneous gas-cooled systems are accorded an outside chance to make the grade as thermal breeders, Weinberg reports that earlier studies showed that the aqueous homogeneous system has a decided edge. And since this reactor was originally conceived as a thorium-uranium-233 breeder, the new program requires only a small change in direction. ORNL's second homogeneous reactor experiment (HRE-2) has been operating almost continuously since early June, with excellent stability up to the design power level of 5 megawatts. And there's reason to believe, Weinberg says, that it can operate at a good deal more than 5 mw.

Same Old Problems: As it gathers steam in the new fiscal year, AEC still faces the same major problems: how to develop low-cost nuclear power; how to entice commercial operators into the fuel-reprocessing and test-reactor businesses; how to dispose of the radioactive wastes that will constitute a growing problem as nuclear power becomes a commercial reality.

The year opened with some Democrats, still heady from the November election victories, talking in terms of a greatly expanded civilian reactor program—perhaps including large-scale government-built reactors. However, this ran head-on into a decreasing public appetite for big spending, the stubborn refusal of economic power prospects to become much rosier, and the growing realization—both here and abroad—that fossil fuels are likely to be plentiful and cheap for a long time to come.

When the smoke cleared, the Joint Committee on Atomic Energy had authorized a reactor development program which clearly reflects AEC's determination to concentrate on those reactors that show the most promise and to let the rest go by the boards.

Large-scale reactors are conspicuously missing (*CW, Jan. 31, p. 30*). As a result, AEC is building a $30-million gas-cooled reactor at ORNL, has $4 million for a low-temperature process-heat reactor to be used in conjunction with the Interior Dept.'s sea-water conversion plant in California (*CW Technology Newsletter, Aug. 22*) and $6 million for a second organic-moderated experiment

at the Idaho testing station.

In addition, the commission is authorized to spend $55.5-65.5 million for research and development assistance to publicly, cooperatively or privately owned utilities in building five or six power reactors, some of which will be started this fiscal year.

Government Monopoly: As to such functions as fuel reprocessing and test irradiation, AEC Chairman John McCone and other commission spokesmen still speak hopefully of the desirability of breaking government domination. However, they acknowledge that this will likely remain a pipe dream for some years to come.

For example, in an effort to promote construction of more private test reactors, the commission issued invitations to industry for provision of test irradiation services for the government. Eleven firms responded; but it's understood that AEC was disappointed that most of the applicants wanted five-year contracts large enough to cover all or most of the capital cost.

Similarly, uncertainties in the Army's food-irradiation program—growing out of the discovery that residual radiation can be induced in the food at high intensities—have apparently cemented the food industry's determination to sit back and wait for results of the government effort before taking any risk of their own. And in the areas of fuel reprocessing and heavy-water production, there's no serious talk at present of any commercial concerns going into the business. In fact, AEC's sales of heavy water are scheduled to take a nosedive this coming year—from $4.2 million to $1.7 million.

Disposal Headaches: AEC is faced with a growing public awareness of —and alarm over—potential hazards from radioactive waste disposal in streams and close-to-shore ocean areas. But it has headed off the threat of Congressional action, at least for the time being.

High-level wastes—such as spent-fuel elements—are stored in underground vaults ashore and, the commission says, will continue to be handled in this manner. But public concern is centered on the less dangerous, low-level wastes which are dispersed into rivers or buried in the ocean.

To date, ocean disposal has been mostly confined to depths of 1,000 fathoms or more. But in response to a query from AEC, a committee of the National Academy of Sciences recently suggested that wastes might safely be dumped at a score of points in water as shallow as 54 ft., and as close as 19 miles to the Gulf and Atlantic coasts.

AEC and NAS stopped serious consideration of the measure for now by emphasizing that the NAS committee report itself recommended further study of the prospective sites, and that nothing would be done without extensive surveys and public hearings. However, it's obvious that AEC faces a rough task in persuading the public that waste disposal will not harm human or marine life.

Commercial Development: The growing commercial significance of isotopes is clearly shown by AEC's budget allotment of $6.1 million—a substantial increase over the $44,000 spent in '58 and $3 million allocated to isotopes in '59. The nuclear explosives program (Project Plowshare) has been switched from AEC's weapons program and lumped with isotopes under civilian applications. Plowshare, too, came in for a big increase—from $326,000 in '58 and $2.7 million in '59 to $8 million.

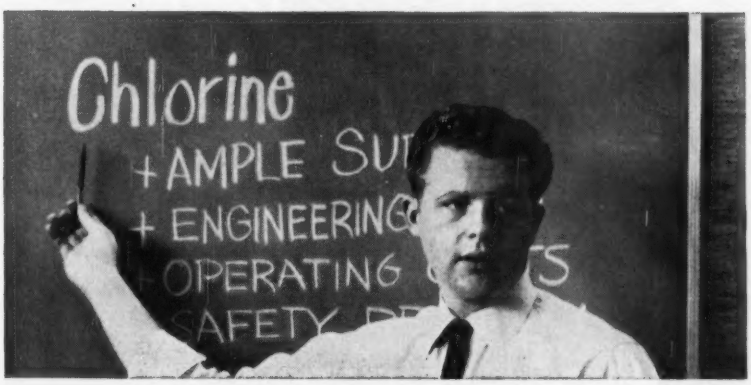
In the area of more basic research, AEC switched its controlled thermonuclear research program (Project Sherwood) out of the reactor development category, put it under the physical research program. Boosted to double the $18-million outlay in '58, Project Sherwood's $36-million slice of the '60 budget represents the biggest single item under physical research.

McCone told a House Appropriations Subcommittee that, while thermonuclear fusion is a much more difficult problem than anticipated two or three years ago, substantial progress has been made and the U.S. is evidently making better progress than other nations. However, he added, we face the prospect of supporting this very costly research at the present level for some years to come.

By killing a few of the less promising prospects and bolstering such projects as the thermal breeder and thermonuclear devices, AEC is striving hard to achieve the optimum balance and continuing progress of both immediate and long-range goals.

BRIEFS

on 4 chlorine "pluses" . . . a caustic soda guide . . . 3 built-in sodium sulfide controls . . . an important sulfide drum



You get these 4 pluses when you ask for *Hooker* chlorine

1. Engineering help. You can get aid from Hooker engineers in planning or revamping your chlorine handling system.

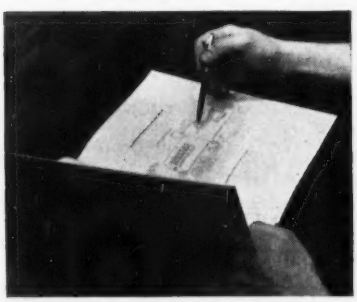
2. Operating hints. Our technical service men can often spot—and help you fix—troubles before they become serious. You get periodic technical service visits.

3. Safety programs. We keep you up to date on the safest and most economical handling methods.

4. Ample supply from Hooker plants which bridge the continent: Niagara Falls, Montague, Mich., Tacoma, and North Vancouver. And, of course, you get a chlorine that meets high industry standards when you ask for Hooker.

Send the coupon for our Chlorine Manual, 76 pages of useful facts on chlorine, its handling and usage.

Phone or write the nearest Hooker sales office for further information on how we can help you.



Fact-filled guide book gives data on handling caustic soda safely

Here is a practical, easy-to-use book on the safest ways to store and handle liquid caustic soda.

It tells you how to unload a tank car, gives methods for diluting caustic soda to different strengths, tells how to store efficiently and with least risk of iron pickup.

Large, detailed diagrams show you the equipment to use. 18 charts, graphs and tables help you foretell how caustic soda will act under a wide range of working conditions.

Get your free copy by checking the coupon.

Why our sodium sulfides are always full strength

Take a look at this drum.

It was planned to bring Hooker sodium sulfide and sulfhydrate to you at full strength and to keep it that way until it's used up in process.

This drum is lacquer-lined. It is sealed with lacquer around the cap. Six sturdy lugs hold the cap fast during handling and storing.

There's another reason you always get Hooker sodium sulfides at full strength—we use only new containers.

Check the coupon for specifications.

For more information on chemicals mentioned on this page, check here:

- ☐ Hooker Chlorine Manual
- ☐ Hooker Caustic Soda Guide
- ☐ Sodium Sulfide Data Sheet
- ☐ Sodium Sulfhydrate Data Sheet

Clip and mail with your name, title, and company address.

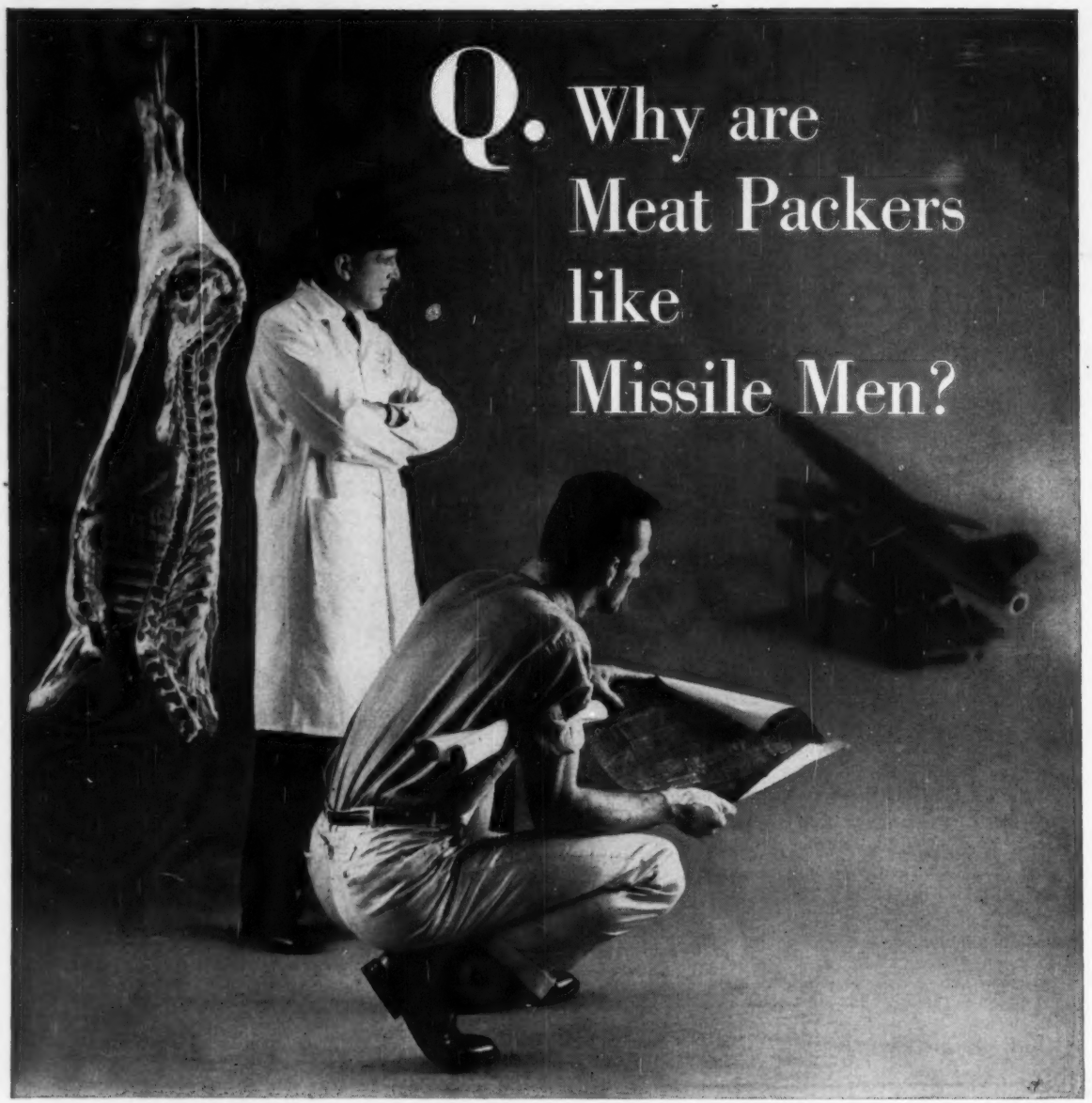
HOOKER CHEMICAL CORPORATION

70[illegible] Forty-seventh Street, Niagara Falls, N. Y.

Sales Offices: Chicago Detroit Los Angeles New York Niagara Falls Philadelphia Tacoma Worcester, Mass.

In Canada: Hooker Chemicals Limited, North Vancouver, B. C.

HOOKER CHEMICALS PLASTICS



A. *Some of their toughest problems have been solved by advances in chemical research and production pioneered by Merck.* Ultra-Pure Silicon crystals produced by Merck play a major role in improving performance of rectifiers and other semiconductor devices used in missile systems. Similarly, Merck research in the food processing field led to Neo-Cebitate®, a new, low-cost reducing agent that shortens curing time and vastly improves eye appeal of all processed meats.

Neo-Cebitate and Ultra-Pure Silicon are representative of chemical progress by Merck that actively helps hundreds of leading manufacturers improve the performance of their products, cut production costs, and explore new fields. For technical information bulletins on Ultra-Pure Silicon or Neo-Cebitate write to Department CW-5,

MERCK & CO., INC. · Chemical Division · **Rahway, New Jersey**

Imports trace the trend of the natural gum business in the U.S. Ahead . . .

Imports of Natural Gums
1953-58

	Gum Tragacanth		Gum Arabic	
	Pounds	*Value*	*Pounds*	*Value*
'53	1,344,471	$762,770	16,694,649	$1,635,622
'54	1,018,614	639,993	15,321,444	2,018,428
'55	1,379,405	1,166,480	17,261,736	2,706,927
'56	972,151	976,968	18,676,964	2,838,484
'57	1,221,317	1,317,610	19,151,298	2,982,536
'58	1,136,451	1,025,188	20,447,767	3,156,383

	Karaya Gum		Locust Bean Gum	
	Pounds	*Value*	*Pounds*	*Value*
'53	6,549,232	$835,840	10,294,769	$2,091,110
'54	5,920,087	840,643	10,105,918	1,796,840
'55	7,111,122	1,920,026	12,965,038	2,570,382
'56	7,014,039	1,750,247	15,065,156	3,833,254
'57	7,161,382	1,436,642	6,963,487	2,065,351
'58	7,626,509	1,321,334	8,606,420	2,270,710

New 'Chemical' Role for Natural Gums

This week, last-minute changes are being incorporated into plans for a new gum processing plant Duché Uni-Gum Corp. (New York) will erect soon in Clifton, N. J. And in another two months, a brand-new gum processing plant will be opened in Charleston, N. C., by Stein, Hall & Co., Inc. (New York). Not to be left behind, Morningstar-Paisley (New York), which recently opened a highly automated gum processing plant in Hawthorne, N. J., has plans for a new guar gum processing plant in India. These plans by three large suppliers of natural gums indicate a lively future for water-soluble natural gums—a business now estimated at around $25 million annually in the U.S.*

Though hundreds of gums are available for thousands of applications, the major share of the U.S. market for water-soluble natural gums has been captured by a relatively small number of products, namely gums arabic, karaya, tragacanth, locust bean and guar.

The most widely used gum imported into the U.S. today is gum arabic. Around 20 million lbs. were imported in '58, an increase of over 1 million lbs. from '57, up 5 million lbs. over '54. Most of this gum came from the African Republic of Sudan, from the exudations of the *Acacia senegal* tree.

Well over half of the gum produced now goes into foods. Uses: as stabilizer, emulsifier and binding agent. It's also used as a foam stabilizer in beer. Besides the brewing and food fields, the major applications of the gum are in the pharmaceutical, cosmetics, adhesives, printing and textile industries. It is also finding use in special coatings such as the thixotropic materials turned out by National Cash Register. Spray-dried foods are another growing market for this gum.

The arabic price is relatively high right now and might go higher if the supply situation — the worst in 40 years — doesn't improve soon. Little gum is being produced this year because of bad weather in the Sudan, and another bad crop could raise prices for the gum substantially in the next six months.

Guar Growing: The market for guar gum has probably grown the fastest in the industry. In '54, little more than 2.5 million lbs. were consumed in the U.S. Today, around 22 million lbs. are used in the U.S. each year in paper, food, textile and mining applications.

Biggest use for guar gum is in the paper field, where it's used in the "wet end" of papermaking to replace or supplement the natural hemicelluloses in the paper. It's also used to improve retention of fillers and as an additive in size press or calender operations.

About half of the guar gum now used in the U.S. goes into papermaking. The bulk of the rest is used in mining (as a flocculant); in foods (as a thickener and binder of water); in cosmetics (as a thickener); and in

* If the water-soluble seaweed gums (agar and algin) are included, the market is closer to $35 million annually. For a report on those gums see *CW, July 21, '56, p. 57.*

explosives (to improve water resistance).

Unlike most of the natural gums (excluding those from seaweed), guar gum can be grown domestically. Sizable acreages of the guar plant have been planted in Vernon and Kenedy counties in Texas and each year an increasing percentage of the U.S. consumption of the gum comes from this area. Though it's more expensive to produce than are foreign grades, the use of mechanical harvesting methods has fairly well overcome this disadvantage. Because the guar plant can be grown on nonirrigated soil there's interest in it as a crop.

Most of the guar gum, however, is imported, the majority coming directly from India and Pakistan. Some 2 million lbs. of it comes here via Europe. Guar, along with the locust bean, is one of the few gums that U.S. producers process abroad (they sell some of the by-products as cattle feed). Almost all of the other gums come to the U.S. in raw form for further processing.

Locust Lagging: Locust bean gum has had more of an up-and-down career in recent years than any other of the natural gums. In '58, around 8.6 million lbs. were imported, more than 1.5 million lbs. above '58's demand, but a drop of almost 7 million lbs. from the '56 high of 15.06 million lbs. Bad weather in the Mediterranean in '56, coupled with the resultant high prices, helped drop that gum's percentage of the over-all gum market. Also contributing to the smaller amount of locust bean gum exports was the switch by many papermakers from locust to guar gum. This trend has not been so great in the last year and many gum suppliers are now pushing combinations of locust and guar gum in papermaking.

Most of the locust bean gum coming to the U.S. in '58 came from Spain (2.4 million lbs.), Italy (2.04 million lbs.), the Netherlands (1.2 million lbs.), Portugal (1.5 million lbs.) and Greece (1.08 million lbs.). In addition a small amount came from Switzerland and the U.K.

Locust bean gum, though losing part of its market in the papermaking field, still is used extensively for that purpose; about half of all the locust bean gum goes into papermaking. It's also used in the food field, as a texture improver in sausage products and as a thickener in canned meats and fish. It's a good stabilizer for ice cream and soft cheeses and acts as a stabilizer and thickener for sauces and salad dressings.

Karaya on Its Own: Gum karaya, originally introduced as an inexpensive substitute for gum tragacanth, is now an important gum in its own right. Last year some 8.6 million lbs. were imported, the vast majority coming from India, where its source, the large bushy *Stericulia urens* tree, is found almost exclusively.

Almost all of the gum karaya produced in the world comes to the U.S., where it finds use in pharmaceuticals, paper, foods and textiles. One of the important uses for it in the pharmaceutical field is that of a bulk laxative. The gum has great swelling power — it can absorb water and swell to 100 times its original volume. It also is used as a denture adhesive. In the paper field, its use is largely that of a binding agent for long-fibered, lightweight papers. In foods, it keeps sherbets and ice pops from forming ice crystals and prevents "bleeding" of water. In textiles, it's used as a thickening agent for cotton dyes.

Tragacanth Steady: Though one of the more expensive of the natural gums — $1.25/lb. — gum tragacanth hasn't lost out to less costly gums. In '58, 1.1 million lbs. of it were imported, the vast majority from Iran (1.01 million lbs.), while a small amount came from the U.K. (16,500 lbs.) and from Western Germany (25,500 lbs.).

Price has not been very stable on this material, and in recent years a pound of a grade that normally sold for $1.25 has been pegged at $4.

The gum's major market has always been the pharmaceutical field, and that will likely remain the chief outlet for some-time. It's used as a suspending agent. It's also used in hair and hand lotions and depilatory creams. There's also a small amount used in leather polishes and in textile sizes.

Who Sells Them: The majority of gums marketed in the U.S. today are sold by a handful of firms, most of them headquartered in New York. The two largest importers and processors of gum are Morningstar-Paisley and Stein, Hall. For the most part, Morningstar-Paisley dominates the

Let's call Koppers!

. . . they have the facilities to solve our new product problem!

It's a good bet you can select the quality products in the quantity you need for your processing, from Koppers full line of fine chemicals, including Resorcinol, Resorcinol Derivatives and Intermediates.

Our plant technologists are available to assist you in selecting proper materials for your operations . . . or in creating new products to add to your line. We are equipped to make laboratory samples, pilot plant quantities and full plant runs.

Why not take advantage of Koppers cooperative service and flexible facilities. For complete details, get in touch with your nearest Koppers representative, or write or wire Koppers Company, Inc., Chemicals and Dyestuffs Division, Pittsburgh 19, Pennsylvania.

KOPPERS®

KOPPERS FINE CHEMICALS

Sales offices and warehouses in major cities

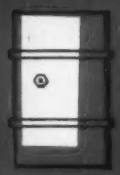
Plants: Lock Haven and Petrolia, Pennsylvania

In Canada:
Dominion Anilines & Chemicals, Ltd.

Koppers Service can also help you!

1. LABORATORY FACILITIES

—for small product samples.



2. PILOT PLANT RUNS

—of your products under your normal operating conditions.

3. FULL PLANT RUNS

—of any products of interest to you.

Here are just a few of Koppers line of fine chemicals:

Resorcinol
Catechol
Resorcinol Monoacetate
4-Chloro Resorcinol
o-Nitroaniline
p-Nitroaniline
o-Anisidine
o-Phenylenediamine
2,4-Dinitroaniline
4-Chloro-2-aminotoluene
2-Hydroxy-3-naphthoyl m-nitroanilide
2-Hydroxy-3-naphthoyl o-toluidide
2-Hydroxy-3-naphthoyl o-anisidine
Butyl Stearate
3,5-Dinitrobenzoic acid
Propiophenone
Aceto-acet-anilides

Prompt Delivery on All Shipments
. . . Special Service in Emergencies

U.S. arabic gum market, doing about 60% of the business in that item. Morningstar-Paisley (70%) and Stein, Hall (20%) share the largest portion of the locust bean gum market, while Stein, Hall has about 60% of the guar gum business, followed by Morningstar-Paisley and General Mills.

In gum tragacanth, Morningstar has about 40%, of the U.S. market, Stein, Hall about 20%, Tragacanth Importing Corp. most of the rest. Stein, Hall has about 50% of the gum karaya business, M-P about 40%.

Duché-Uni-Gum sells mostly food-grade gums, while S. B. Penick's gums are premium grades intended mostly for the pharmaceutical and food fields.

Other suppliers of water-soluble natural gums include Barclay Chemical Co., Colony Import & Export Corp., Tragacanth Importing Corp. (all of New York), Burtonite Co. (Nutley, N.J.), Joy Chemical (Pawtucket, R. I.) and Hathaway Allied Products (Los Angeles).

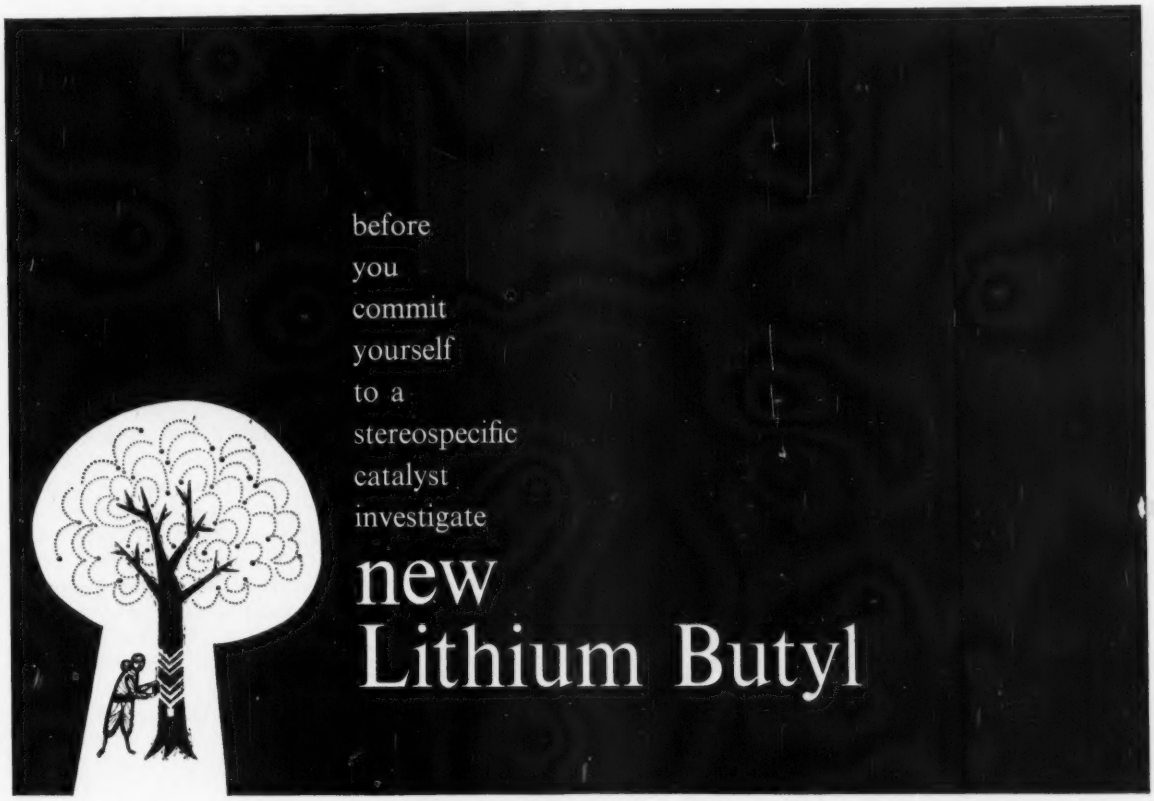
There's little in the way of foreign competition in the U.S. at present. Some companies such as Cesalpina (Milan, Italy), Tragasol (Hooten, England) and Meypro Ltd. (Weinfelden, Switzerland) sell their products in the U.S. but deal through U.S. gum houses, never sell direct.

Few Do-It-Yourselfers: There has been only a small amount of captive gum processing. A few large users such as Pine Brothers, Block Drug and Henry Heide grind their own gums, but even these companies obtain their supplies from the U.S. gum houses.

Few Jobbers: There are few if any jobbers in the gum industry. About the closest approximation to jobbers are suppliers of bakery and breweries. And, in addition, there are some resales made through wholesale drug houses.

If anything, the number of suppliers of the natural gums will probably diminish in the future. When, as formerly, these products were handled as commodities, an importing house would take advantage of a good price situation and get into the market for a quick profit. The trend now is to consider these gums as chemical products and to have technical service labs back them up.

Synthetics to Take Over? There's been little evidence of any large in-



1. First off, lithium butyl is not new. What *is* new is its commercial availability in a solvent rather than an ether vehicle. Highly stable, it can be stored at room temperature for indefinite periods without deterioration. And you can handle it just as freely under nitrogen as under argon or helium.

2. Lithium butyl is a single component catalyst of known composition with homogeneous reaction mechanism. Compared with conventional heterogeneous catalysts of uncertain composition, lithium butyl permits more accurate predictions of final polymer performance . . . makes controls easier to establish and hold.

3. The amount of lithium derived catalyst required in ordered isoprene polymerization is extremely small. Possibly less than 0.01% of the isoprene. And the amount of the catalyst remaining in the polymer is even smaller . . . of the order of parts per million. Thus, despite its relatively high price, lithium contributes very little to the *cost* of the product. It may actually reduce the cost by permitting economical simplification of post polymerization treatment of the polymer.

4. Little definitive information has been published as to the merits of various catalyst systems in natural rubber synthesis. Both Ziegler and lithium catalyzed rubber show approximately the same percentage of *cis*-1,4 isomer. But there is one product difference. Lithium catalyzed polyisoprene has a higher molecular weight than either Ziegler types or natural hevea rubber. Ultimately, the efficiency of the catalyst may depend more on the purity of the monomer than on any other single factor.

5. Participants in the 1958 Gordon Research Conference on polymers clearly stated the need for efficient, soluble, stereospecific catalysts in large quantities. Lithium butyl satisfies all of these needs.

6. Lithium butyl has been suggested as a substitute for aluminum alkyls in Ziegler type catalysts. An excellent yield of *cis*-1,4 polybutadiene has been reported as resulting from such a substitution.

7. The commercial future of Foote's new lithium butyl preparation seems assured. Its potential in ordered polymerization has been established. And numerous research projects are focusing on it as an intermediate. If you'd like to renew your acquaintance with lithium butyl, just return the coupon, checking your specific interest.

FOOTE
MINERAL COMPANY

FOOTE MINERAL COMPANY
420 Eighteen West Chelten Bldg.
Philadelphia 44, Pennsylvania

Gentlemen: Please send me the following checked monographs:

- ☐ #100—Catalytic Lithium
- ☐ #101—Lithium in Organic Chemistry
- ☐ #103—Lithium Butyl
- ☐ #104—Catalytic Lithium in Polymerization

Plus information on ☐ sample quantities ☐ commercial quantities

Name_____

Company_____

Address_____

roads into the natural gum markets by synthetics. Certainly, one thing that will inhibit any wide use of synthetics is the large amount of natural gums that are used as food additives. Most of the natural gums have cleared FDA's tight rules; thus, extensive and expensive testing isn't needed. The new materials, on the other hand, need such clearance if they are to be used in foods.

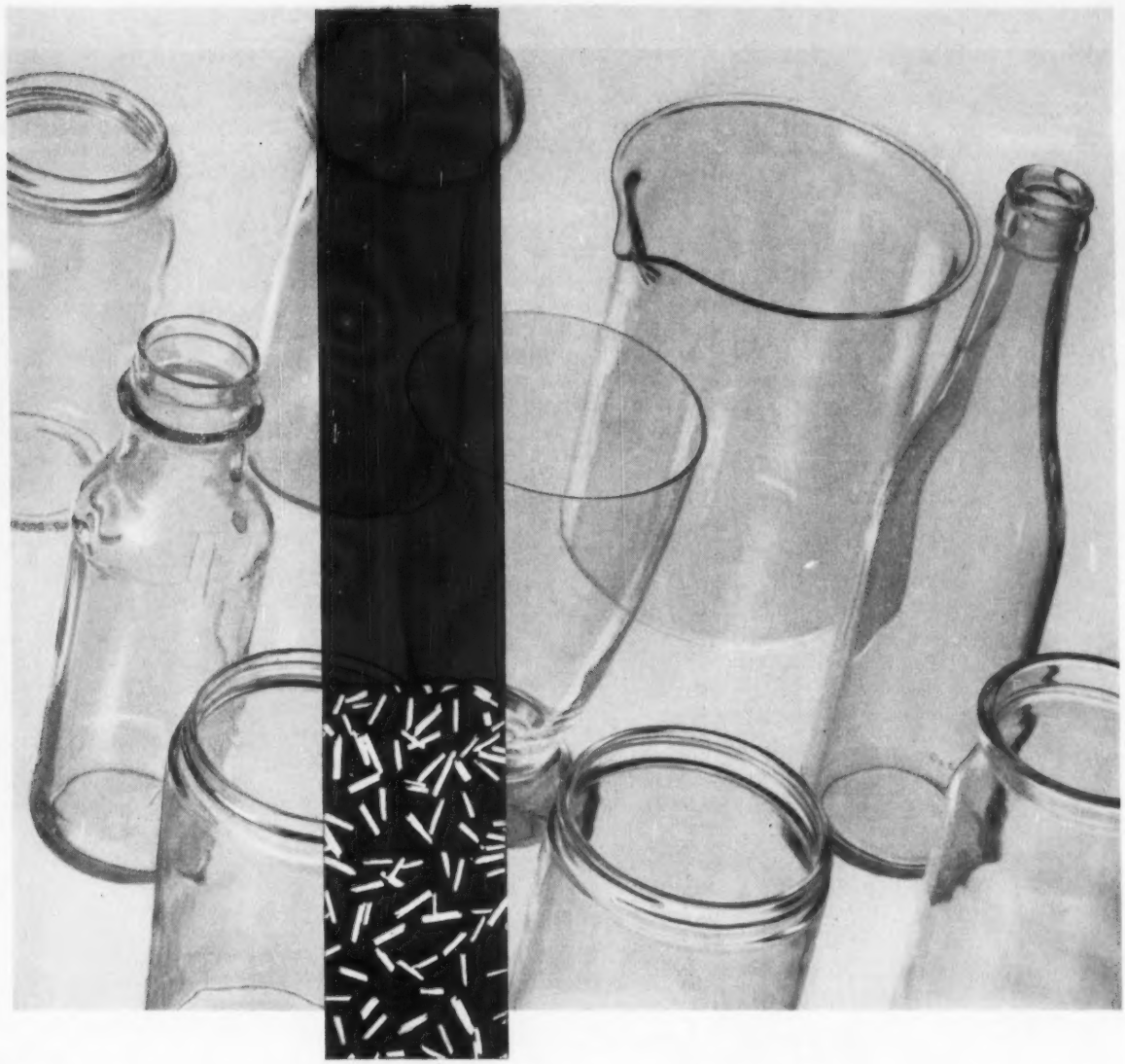
Price fluctuations, one of the major incentives for developing synthetics, no longer come into play. There have been some periods when weather has caused some short-term price fluctuations, but over-all the prices haven't varied too much. Examples: karaya gum and gum tragacanth are selling for the same today as they were in '52, while guar gum and locust beam gum have been reduced in price.

Since most of the cost of the natural gums goes for the labor of collection, it's likely that rising world labor standards will result in a higher price for the material in future years. However, since most of the gums are obtained from Asia, where the rise in labor standards is the slowest, it might be some time before higher prices become a problem.

No Shortage in Sight: There's little danger of any of the sources of the gums dying out, according to most gum suppliers. In fact there have been movements on the part of the governments of India, Pakistan and Iran to insure more scientific planting and better tapping methods of the plants that yield the gums. Outside of guar gum and possibly locust bean gum, there's little likelihood of any new sources of supply. Little has come of the few scattered attempts to raise gum producing plants in South America and other places.

Commodities Now Chemicals: As the gum processors learn more about the nature of the products they handle, the gum field will take on some the characteristics of a chemical trade rather than a commodity trade. There are already many blends of the various gums doing work no single gum can do.

Moreover, gum chemists are learning fast how to chemically alter gums to give them new properties. The increasing emphasis on research will do a lot to help the natural gums keep the markets they have, help create new applications for them in the future.



for homogeneous glass... *acicular soda ash*

Tiny, needle-like crystals of Westvaco Soda Ash are ideal in size and shape for better glass-making.

With a natural tendency to interlace like twigs, the needle-like crystals minimize sifting and segregation so you get uniform melting throughout the batch. High ratio of surface area-to-volume gives you optimum melt rate. And minimum dusting means little or no blow-over to the checker chambers.

Result is a more homogeneous glass . . . at economical furnace temperatures . . . with longer life for checker refractories.

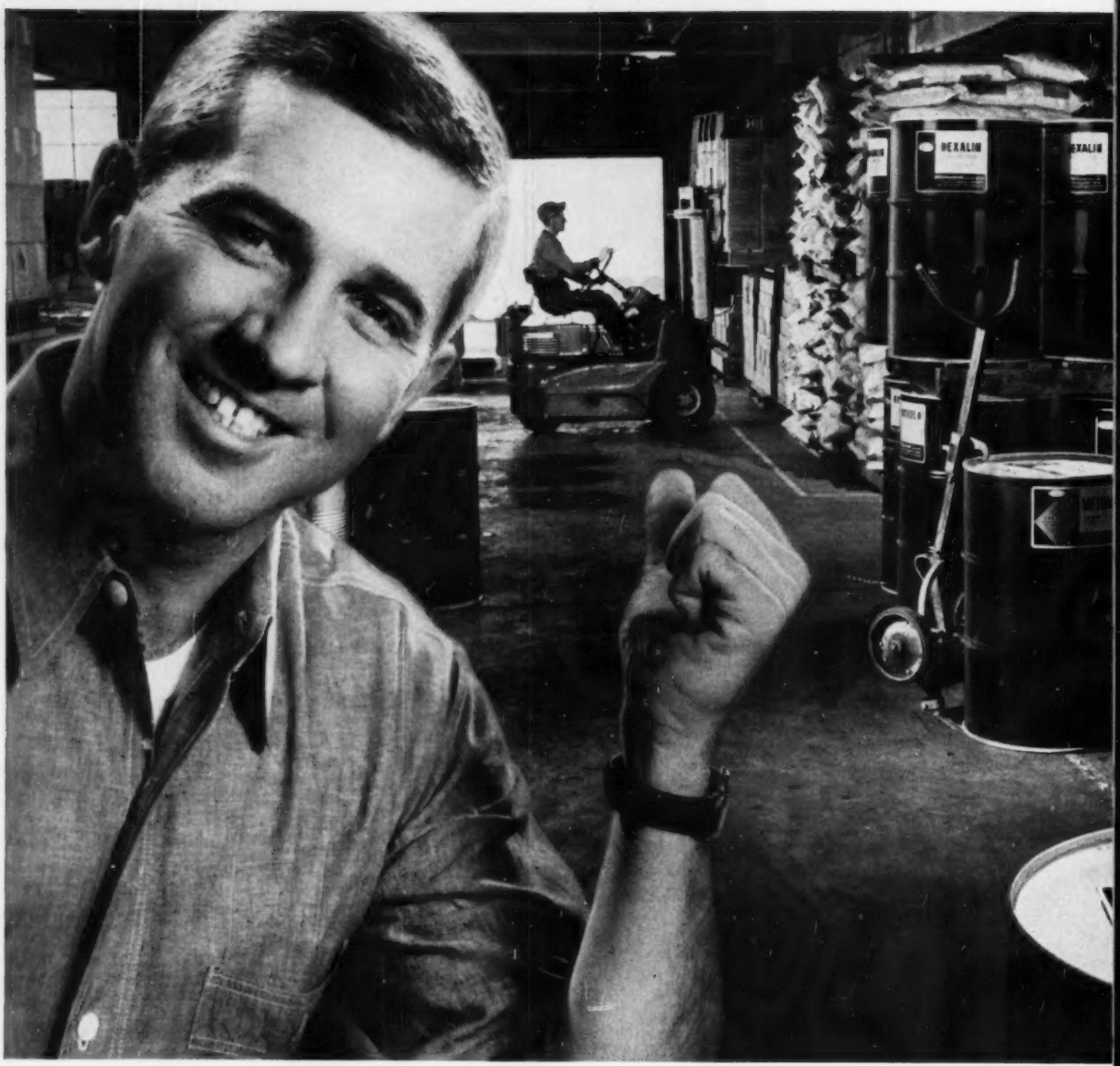
These well-known advantages of Westvaco Soda Ash can be yours at no added cost. We'll be glad to quote on your requirements.

Putting Ideas to Work

FOOD MACHINERY AND CHEMICAL CORPORATION

Westvaco Chlor-Alkali Division

General Sales Offices:
161 E. 42nd STREET, NEW YORK 17



Call your local Du Pont Chemical Agent for Methanol, Urea, "Hexalin"* Cyclohexanol and "Hytrol"* O Cyclohexanone

FOR METHANOL

ARIZONA
Phoenix — Braun Chemical Co.

CALIFORNIA
Los Angeles — Braun Chemical Co.
San Francisco — Braun-Knecht-Heimann Co.

COLORADO
Denver — Braun-Knecht-Heimann Co.

FLORIDA
Jacksonville — Apperson Chemical, Inc
Miami — Biscayne Chemical Labs, Inc.
Orlando — Lenfestey Supply Company
Tampa — Lenfestey Supply Company
Tampa — Miller-Lenfestey Supply Company

GEORGIA
Atlanta — Chemical Services, Inc.

ILLINOIS
Chicago — Central Solvents & Chemicals Co.
Chicago — Phillips & Martin Co.

INDIANA
Ft. Wayne — Hoosier Solvents & Chemicals Corp.
Indianapolis — Hoosier Solvents & Chemicals Corp.

IOWA
Des Moines — Miller Chemical Co.

KANSAS
Wichita — Barada & Page, Inc.

KENTUCKY
Louisville — Dixie Solvents & Chemicals Co.

LOUISIANA
New Orleans — Southern Solvents & Chemicals Corp.

MARYLAND
Baltimore — Leidy Chemicals Corp.

MASSACHUSETTS
Boston — Howe & French, Inc.
Holyoke — Eastern Chemicals, Inc.

METROPOLITAN NEW YORK
Lyndhurst, N. J. — Stoney-Mueller, Inc.

MICHIGAN
Detroit — Western Solvents & Chemicals Co.
Grand Rapids — Wolverine Solvents & Chemicals Co.

MINNESOTA
St. Paul — Lyon Chemicals, Inc.

MISSOURI
Kansas City — Barada & Page, Inc.
Kansas City — Missouri Solvents & Chemicals Co.
St. Louis — Missouri Solvents & Chemicals Co.

NEBRASKA
Omaha — Miller Chemical Co.

NEW JERSEY
Lyndhurst — Stoney-Mueller, Inc.

NEW MEXICO
Albuquerque — Braun Chemical Co.

NEW YORK
Albany — Eastern Chemicals, Inc.
Binghamton — Collier Chemicals, Inc.
Buffalo — Buffalo Solvents & Chemicals Corp.
Johnstown — S. H. Ireland Chemical Co.
New York — Stoney-Mueller, Inc.
Rensselaer — Eastern Chemicals, Inc.
Syracuse — Eastern Chemicals, Inc.

NORTH CAROLINA
Durham — Cardinal Products, Inc.

OHIO
Cincinnati — Amsco Solvents & Chemicals Co.
Cleveland — Ohio Solvents & Chemicals Co.
Toledo — Toledo Solvents & Chemicals Co.

OKLAHOMA
Oklahoma City — Ward Chemical & Supply Co.
Tulsa — Ward Chemical & Supply Co.

OREGON
Portland — Van Waters & Rogers, Inc.

PENNSYLVANIA
Pittsburgh — Vitro Manufacturing Co.

TENNESSEE
Memphis — Chapman Chemical Co.

TEXAS
Dallas — Texas Solvents & Chemicals Co.
Dallas — Van Waters & Rogers, Inc.
El Paso — Braun Chemical Co.
Houston — Texas Solvents & Chemicals Co.
Houston — Van Waters & Rogers, Inc.

UTAH
Salt Lake City — Braun-Knecht-Heimann Co.
Salt Lake City — Wasatch Chemical Co.

WASHINGTON
Seattle — Van Waters & Rogers, Inc.
Spokane — Van Waters & Rogers, Inc.

WISCONSIN
Chippewa Falls — Lyon Chemicals, Inc.
La Crosse — Wisconsin Solvents & Chemicals Corp.
Milwaukee — Wisconsin Solvents & Chemicals Corp.

FOR UREA

ALABAMA
Birmingham — F. H. Ross & Co.
Mobile — F. H. Ross & Co.

ARIZONA
Phoenix — Braun Chemical Co.

CALIFORNIA
Los Angeles — Braun Chemical Co.
San Francisco — Braun-Knecht-Heimann Co.

COLORADO
Denver — Braun-Knecht-Heimann Co.

CONNECTICUT
South Norwalk — Merchants Chemical Co., Inc.

"What's more . . . we can supply all your chemical needs!"

Your local Du Pont Chemical Agent represents many leading chemical companies . . . can be a single source of supply for most, if not all, your requirements. That means one-stop buying which saves you time, simplifies bookkeeping, eliminates costly delays. And because your local agent has the manpower, equipment and personal interest in your business, you can always rely on him for fast, dependable service.

Your agent stocks quality chemicals . . . offers them in *any* quantity you need. A single phone call is all it takes to supply time-proven chemicals, including: high-purity (99.85%) Du Pont Methanol, crystal and free-flowing "Shotted" Urea, and reactive cyclic ketones such as Du Pont "Hytrol" O Cyclohexanone and "Hexalin" Cyclohexanol.

Technical assistance is also available through your agent. Since he represents Du Pont in your area, he can arrange a meeting with a Du Pont Technical Representative when needed. You'll benefit from the advantages your agent has to offer. Call him today!

INDUSTRIAL & BIOCHEMICALS DEPARTMENT

DU PONT

REG. U. S. PAT OFF.

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

FLORIDA
Jacksonville — F. H. Ross & Co.

GEORGIA
Atlanta — F. H. Ross & Co.
Columbus — F. H. Ross & Co.
Savannah — F. H. Ross & Co.

ILLINOIS
Chicago — Central Solvents & Chemicals Co.
Chicago — McKesson & Robbins, Inc.

INDIANA
Ft. Wayne — Hoosier Solvents & Chemicals Corp.
Indianapolis — Hoosier Solvents & Chemicals Corp.

KENTUCKY
Louisville — Merchants Chemical Co., Inc.

LOUISIANA
New Orleans — Barada & Page, Inc.

MARYLAND
Baltimore — Leidy Chemicals Corp.

MASSACHUSETTS
Fall River — Borden & Remington Co.
Stoneham — George Mann & Co., Inc.
Worcester — Chemical Sales & Service Co., Inc.

MICHIGAN
Detroit — Eaton Chemical & Dyestuff Co.

MINNESOTA
Minneapolis — Merchants Chemical Co., Inc.

MISSISSIPPI
Jackson — F. H. Ross & Co.

MISSOURI
Kansas City — Barada & Page, Inc.
St. Louis — Barada & Page, Inc.
St. Louis — Missouri Solvents & Chemicals Co.

NEW HAMPSHIRE
Merrimack — New England Chemical Supply Corp.

NEW JERSEY
Newark — National Oil & Supply Co.
Paterson — Brown Chemical Co., Inc.

NEW YORK
Buffalo — Chemical Sales Corp.
Hicksville, Long Island — National Oil & Supply Co.
New York — Merchants Chemical Co., Inc.

NORTH CAROLINA
Charlotte — F. H. Ross & Co.
Greensboro — F. H. Ross & Co.
Raleigh — F. H. Ross & Co.

OHIO
Cincinnati — Merchants Chemical Co., Inc.
Cleveland — Ohio Solvents & Chemicals Co.
Columbus — Merchants Chemical Co., Inc.

OREGON
Portland — Van Waters & Rogers, Inc.

PENNSYLVANIA
Altoona — Western Penna. Chemical Co., Inc.
Erie — Western Penna. Chemical Co., Inc.
Middletown (Harrisburg) — Western Penna. Chemical Co., Inc.
Philadelphia — Pioneer Salt Co.
Pittsburgh — Western Penna. Chemical Co., Inc.
Reading — Textile Chemical Co., Inc.

RHODE ISLAND
Providence — Borden & Remington Co.
Providence — George Mann & Co., Inc.

SOUTH CAROLINA
Columbia — F. H. Ross & Co.
Greenville — F. H. Ross & Co.

TENNESSEE
Chattanooga — Burkart-Schier Chemical Co.
Knoxville — Burkart-Schier Chemical Co.
Knoxville — F. H. Ross & Co.
Nashville — Burkart-Schier Chemical Co.

TEXAS
Dallas — Van Waters & Rogers, Inc.
Houston — Van Waters & Rogers, Inc.

UTAH
Salt Lake City — Braun-Knecht-Heimann Co.

WASHINGTON
Seattle — Van Waters & Rogers, Inc.

WISCONSIN
Milwaukee — Merchants Chemical Co., Inc.

FOR "HEXALIN" & "HYTROL" O

CALIFORNIA
Los Angeles — Braun Chemical Co.
Los Angeles — Mefford Chemical Company
San Francisco — Braun-Knecht-Heimann Co.

COLORADO
Denver — Braun-Knecht-Heimann Co.

ILLINOIS
Chicago — Central Solvents & Chemicals Co.

INDIANA
Fort Wayne — Hoosier Solvents & Chemicals Corp.
Indianapolis — Hoosier Solvents & Chemicals Corp.

KENTUCKY
Louisville — Dixie Solvents & Chemicals Co.

LOUISIANA
New Orleans — Southern Solvents & Chemical Corp.

MASSACHUSETTS
Boston — Howe & French, Inc.
Worcester — Chemical Sales & Service Co., Inc.

MICHIGAN
Detroit — Western Solvents & Chemicals Co.

MINNESOTA
Minneapolis — Merchants Chemical Co., Inc.

MISSOURI
Kansas City — Missouri Solvents & Chemicals Co.
St. Louis — Missouri Solvents & Chemicals Co.

NEW JERSEY
Newark — C. P. Chemical Solvents, Inc.

NEW YORK
Buffalo — Buffalo Solvents & Chemicals Corp.

OHIO
Cincinnati — Amsco Solvents & Chemicals Co.
Cleveland — Ohio Solvents & Chemicals Co.
Toledo — Toledo Solvents & Chemicals Co.

TEXAS
Dallas — Texas Solvents & Chemicals Co.
Houston — Texas Solvents & Chemicals Co.

WISCONSIN
Milwaukee — Wisconsin Solvents & Chemicals Corp.

*Reg. U. S. Pat. Off.

"Sure, it talks . . . didn't you just hear it say, 'Spencer Service is Wonderful?'"

Get fast delivery of Spencer Ammonia from: (1) Pittsburg, Ks.; (2) Henderson, Ky.; (3) Vicksburg, Miss.; or (4) Calumet City, Ill. (Aqua Ammonia only.)

NEED AMMONIA? . . .

Discover for yourself why so many of our customers say Spencer Ammonia service is wonderful. Whether you use Aqua Ammonia, Commercial Grade Ammonia or Refrigeration Grade Ammonia, write, wire or phone your order to Spencer Chemical Company. Spencer also produces Metals Grade Ammonia, the purest ammonia on the market today. Ask about it!

SPENCER

"Tanky"... The Symbol of Spencer Service

SPENCER CHEMICAL COMPANY

America's Growing Name in Chemicals

SPENCER PRODUCTS: Ammonia (Commercial, Refrigeration and Metal Treating Grades) • Aqua Ammonia • 83% Ammonium Nitrate Solution • Prilled Ammonium Nitrate • Argon • Methanol • Formaldehyde • FREZALL (Spencer Dry Ice) • Liquid CO_2 • Cylinder Ammonia • Nitric Acid • Uranium Oxide • "Poly-Eth" Polyethylene • "Poly-Pro" Polypropylene • Spencer Nylon • "Mr. N" Ammonium Nitrate Fertilizer • SPEN-SOL GREEEN and URA-GREEEN (Spencer Nitrogen Solutions) • SPEN-AMM (Spencer Anhydrous Ammonia)

GENERAL OFFICES: Dwight Bldg., Kansas City 5, Missouri

DISTRICT SALES OFFICES: 500 Fifth Avenue, New York City; First National Bank Bldg., Chicago, Illinois; Candler Bldg., Atlanta, Georgia; 2158 Union Avenue Bldg., Memphis, Tennessee

Living Lesson in Industrial 'Foreign Policy'

Last week, Chester Goodwin, ex-project manager of the Chemstrand Corp.'s $9.8-million Acrilan plant in Coleraine, Northern Ireland, strode down the gangplank of the Queen Mary in New York. His arrival in the U.S. marked the last stage of the plant's turnover to British nationals—in line with Chemstrand's "foreign policy."

Goodwin brings with him valuable knowledge about how American businessmen can best serve their companies' interests while on foreign assignment.

The only American in Chemstrand's U.K. operation now will be Arvon Davies, managing director of wholly owned Chemstrand Ltd.

Davies feels the policy is good public relations. It helps gain acceptance for the company within the country generally, and specifically within the community where the plant is. That's particularly important in a small town like Coleraine (population: 13,000), still dependent largely on agriculture and not practiced in hosting foreigners or industrialists.

Moreover, Davies points out, there are other definite advantages. "You certainly can't import your hourly workers," he says. "The workers here are used to British supervision, and Britishers know best how to treat them—know their characteristics. And we have to deal here with British laws, British unions, British customs. It makes sense to use supervisors who are familiar with them."

Trial Running: Experience with the U. K. company, Chemstrand's first overseas, will be the initial test of the policy. According to Davies, and supported by the experience of Goodwin, results to date have all been on the plus side.

In practically every instance, supervisory capacities at the plant have, from the very beginning, been filled by Britishers who have been trained either in America or by Americans. Americans have been in evidence primarily as advisors and consultants.

Chemstrand takes very seriously the matter of integrating the plant with the community. Since Coleraine shares with the rest of Ireland the

CW PHOTOS—RON APPELBE

Bidding goodbye, Goodwin (left) reminisces with community leaders.

Checking plans, Goodwin discusses management change-over with British plant manager, engineer he has trained.

'Fairy Tree,' sentimental attachment of local Irish citizens, was saved from axe; plant's road was detoured instead.

need to attract new industry, a warm official welcome was assured. But Chemstrand wanted more than an official welcome, and conducted itself accordingly.

Care and Caution: One example of its solicitude for local interests: the great care taken to avoid harming the commercially important salmon and eels in the River Bann, beside which the plant is located. Fine screens at water intakes prevent baby eels from being drawn out of the river. Effluent is piped 7½ miles to the sea.

Davies is on first-name terms with most of the Coleraine community leaders. He goes pheasant shooting with them and they are often his guests at dinners in the plant guest-house.

Goodwin, too, has cultivated friends in Coleraine. He and his family moved into half of a large Victorian house that had been converted into a duplex. Son Mike, 11, went to a public school, the Coleraine Academical Institute.

Gregarious and friendly people in a gregarious and friendly country, they were quickly accepted by the local citizens. They became involved in a biweekly bridge group, were regular members of parties attending the Saturday night dances at the Corporation Arms Hotel, social center of Coleraine.

Goodwin, an enthusiastic golfer, joined the Port Rush Golf Club, a championship course that's one of the most famous in the UK.

At first, the Goodwins saw no point in joining service clubs, in view of their limited stay. But they became involved anyway, and Goodwin sometimes accompanied friends to luncheons of the local Rotary Club. His wife Ruth also became so integrated

Son Mike fitted into Irish environment, attended public school in Coleraine.

Friendliness, 'doing what comes naturally,' is Goodwin's formula for winning confidence of townfolk.

BUILD SPECIAL PROPERTIES INTO "TAILOR-MADE" POLYMERS WITH VINYLPYRROLIDONE

CONTROLLED SOLUBILITY
DYE RECEPTIVITY
EMULSIFICATION
SURFACE ACTIVITY
ADHESIVENESS
STRENGTH
COMPLEXING ACTION

These are some of the many properties which may be "built into" copolymers to meet specific needs.

Vinylpyrrolidone, a versatile liquid monomer, copolymerizes readily with other monomers. Vinylpyrrolidone also reacts with phenols to form valuable addition compounds.

Vinylpyrrolidone offers a new approach to a wide variety of polymeric products, including synthetic fibers and films, lube oil additives, adhesives, coatings and finishes, glass-fiber laminating resins, and textile sizes. If you work with copolymer systems, see what Vinylpyrrolidone can mean toward product improvement.

For additional information on handling properties, copolymerization procedures, etc., write for Bulletin No. AP-86.

from Research to Reality

ANTARA
gaf

ACETYLENE CHEMICALS DEPARTMENT
ANTARA® CHEMICALS
A SALES DIVISION OF
GENERAL ANILINE & FILM CORPORATION
435 HUDSON STREET · NEW YORK 14, NEW YORK

ADMINISTRATION

with the community that just two weeks before she left Coleraine, friends pressed her into selling flags on a street corner for the benefit of the Cancer Fund.

Goodwin was conscious of his role as goodwill ambassador. But for him —and other successful American businessmen on foreign soil—it is "doing what comes naturally."

LEGAL

Manufacturer's Liability: A case has been filed in Ohio involving the liability of a chemical manufacturer for injuries sustained by a user of his product. A lathe operator in a manufacturing plant in Oakland County, Michigan, and the Michigan Mutual Liability Co. have filed suit in U.S. district court at Toledo for $525,000 against Master Chemical Corp. (Toledo).

The complaint alleges that the operator developed a severe case of dermatitis, suffering severe and permanent injuries, after using a chemical coolant manufactured by Master under a tradename. The suit claims that the manufacturer was negligent —not using sufficient care in making the product, failing to test its harmful effect on those coming into contact with it, and failing to issue warnings about the effects to users of the product.

•

Paint Damage: The Oregon supreme court has held that Reynolds Metals Co. must pay $91,000 for aluminum paint fume damage to the stock farm of Mr. and Mrs. Paul Martin of Troutdale, Ore. Justice Kenneth O'Connell, in the court's decision, said there was ample evidence before the trial court to show that the quantity of fluorides deposited by smoke from the reduction plant was sufficient to render the land unfit for grazing.

A company spokesman said that since '46 Reynolds has spent $6.5 million for installation and operation of equipment to control the amount of fumes escaping from its Troutdale and Longview, Wash., reduction plants.

LABOR

Copper Move: In a last-ditch move to stave off a strike called for last

"I need help—from someone who's been in fatty acids from the beginning!"

To the fatty acid user, the experience of his supplier in the servicing of customers, and in the manufacture and marketing of fatty acids, can mean the difference between a top-notch product and an also-ran.

Consistent high quality of an end product such as a soap or a cosmetic starts with the vegetable oil, tallow or other crude raw material from which the fatty acid is made. A supplier must know his raw material market thoroughly — what to buy, where to buy, when to buy—because he is purchasing natural materials that vary with environmental factors. Long experience here is an invaluable asset in purchasing for maximum uniformity and quality of the ultimate fatty acid, and so of the final end product.

Given the best raw materials, the fatty acid supplier must then analyze them to determine his procedures for optimum production results. Analytical tests alone are not enough. Experience is necessary to evaluate and interpret the tests, to correct for deviations in even the best raw materials. Only by anticipating and recognizing irregularities can steps be taken for their elimination.

Following tests and evaluations, the fatty acid supplier must know how to process his raw materials for the most uniform results. An experienced producer has facilities flexible enough to handle the variations inherent in his raw materials, and still turn out products which adhere to exacting specifications—batch after batch, shipment after shipment. This uniformity assures the fatty acid user that he will get maximum performance in his own manufacture.

An intimate acquaintance with all his markets is essential if a supplier is to provide fatty acids which give best results in any particular end product. An experienced supplier has a standard product line that has actually been tailored to the needs of users over many years. And he sees to it that these products are improved constantly to meet new needs.

Finally, the supplier must know what to do in emergency situations arising in his customer's plant. Only long years of dealing with every conceivable type of customer problem can give him that knowledge.

A. Gross & Company has been making fatty acids since they were introduced — has encountered every type of customer requirement, has assisted in solving an enormous variety of customer problems, has a long-established knowledge of what to buy and sell to give best results in customer end products.

We would be pleased to discuss your fatty acid requirements with you. For information on A. Gross fatty acids, such as **Groco Heat-Stable Red Oils & White Oleines,** send for the brochure "Fatty Acids in Modern Industry."

a. gross & COMPANY

295 Madison Ave., New York 17, N. Y.
Factory: Newark, N. J.
Distributors in principal cities
Manufacturers since 1837

Evaluate fatty acids made by A. GROSS—send for samples of: STEARIC ACIDS • RED OILS • WHITE OLEINES • TALLOW FATTY ACIDS • COCONUT FATTY ACIDS • VEGETABLE FATTY ACIDS • HYDROGENATED FATTY ACIDS • HYDROGENATED GLYCERIDES

ADMINISTRATION

midweek, 1,800 copper miners at The Anaconda Co.'s Butte, Mont., mine told the firm they would call off the strike if the company would accept any pay settlement reached elsewhere in the industry. Their union is the Butte local of the Union of Mine, Mill & Smelter Workers. About 15,000 workers are out on strike against Kennecott Copper Co., Phelps-Dodge and other Western copper producers.

•

Suit, Countersuit: Central States Petroleum Union Local 115, representing workers at Indiana Standard's Wood River, Ill., refinery, has filed a $100,000 countersuit against the firm, charging it with conspiring to prevent union mergers. Merger between CSPU and International Petroleum Workers Assn. has been under discussion for many months, reportedly waits only completion of legal matters.

At the same time, Federal Judge Charles Briggle, in U.S. district court at Springfield, Ill., held over action on the company's $100,000-plus-$33,000/day suit against CSPU Local 115, filed recently. Standard has charged Local 115 with contract violation, claiming that its recognition of IPWA picket lines, despite the no-strike clause in its one-year contract, caused shutdown of the Wood River, Ill., refinery.

Local 115 countercharges that the company failed to keep its contract with the local because it feared a merger between CSPU and all other recognized bargaining agents for petroleum workers.

KEY CHANGES

M. James Campbell to assistant to the vice-president, Solvay Process Division, Allied Chemical Corp. (New York).

Laurel G. Parkinson to director, Amoco Chemicals Corp. (Chicago).

Rudolph W. Kugler to assistant to the president, Cary Chemicals Inc. (Flemington, N.J.).

Douglas M. More to associate counsel, Hooker Chemical Corp. (Niagara Falls, N.Y.).

W. D. Matthews to treasurer, B. F. Goodrich Industrial Products Co., division of B. F. Goodrich Co. (Akron).

Market Newsletter

CHEMICAL WEEK
August 29, 1959

The Western copper strike is hiking quotations on sulfuric acid in the Intermountain area. Garfield Chemical (Garfield, Utah) has been forced to shut down its 1,000-tons/day sulfuric plant, which produces by-product acid from copper-smelting operations.

Consequently major sulfuric consumers in the Intermountain area—e.g., producers of triple superphosphate and uranium—are buying the acid from as far away as Fort Worth, Tex. J. R. Simplot (Pocatello, Ida.)—which has placed a 300-tons/day contact plant onstream but is reportedly buying acid temporarily from Bunker Hill of Kellogg, Ida.—is charging $18/ton at Pocatello; freight charges to Salt Lake boost this cost to about $25/ton. (Garfield's basic price has been $16/ton.)

One offer of sulfuric at $31/ton by a California producer has not yet been picked up by buyers, but purchases at these rates are not out of the question. A spokesman for Western Phosphates (Garfield, Utah) predicts that sulfuric prices will trend upward in proportion to length of the strike until costs climb too high, forcing users to close down.

And there is little hope that the sulfuric acid pinch in the Intermountain area will ease soon, for copper industry observers forecast a long strike. First hit by the walkouts were Kennecott Copper and Magma Corp.; and last week, Anaconda's operations in Montana and Utah, and Phelps-Dodge's in Arizona were halted. This adds up to an estimated 75% cutback of the nation's copper output.

Users of copper, however, aren't showing signs of distress. Copper inventories are substantial, foreign metal is available, metal-working requirements may be curtailed because of the steel strike.

•

Captive production of resins and adhesives by plywood makers on the West Coast (*CW Market Newsletter, Aug. 15*) is cause for concern among independent makers of bonding materials, but isn't yet discouraging plant expansions.

For example, this week American Marietta revealed more details about its plans to build a resin plant at Richmond, Calif. (*CW Business Newsletter, May 30*). Construction of the 28-million-lbs./year facility —AM's first in the San Francisco Bay area—will begin in September.

Apparently, AM won't have to worry much about captive resin production by plywood makers. The firm's product sales will be spread over many other industries, e.g., paper, composition board, electronics, aircraft and missiles manufacture.

•

Celanese has completed a near-doubling of its acetic acid plant at Pampa, Tex., to a capacity of 240 million lbs./year of two basic acetyl chemicals—acetic acid and acetaldehyde.

Market Newsletter

(Continued)

Although acetic acid demand was considered sluggish by some industry observers at the time Celanese began its putting acetic expansion into high gear *(CW, Oct. 18, '58, p. 97)*, the firm now says it is hard pressed to fill demands.

•

Sulfur prices remain unsettled as U. S. producers move to counter Mexican sulfur imports through wider use of special price concessions.

Freeport Sulphur reportedly initiated on July 15 an allowance of $3.50/ton on water shipments of sulfur to East Coast ports. Thus, prices of dark sulfur officially posted at $24/ton and bright sulfur at $25/ton are now quietly being lowered to $20.50 and $21.50/ton, respectively, f. o. b. vessel, Gulf loading ports. An additional freight allowance is also given to offset the difference in the cost of shipping in foreign and American vessels. Midwestern areas are also affected; a special discount of $1/ton is given on barge shipments up the Mississippi and along other inland waterways. Other producers are said to be going along with these price concessions.

•

U. S. isobutyl alcohol tags are uniform this week. The unanimity was achieved after Celanese, pioneer continuous producer (since '46), matched Eastman Chemical's recent 1¢/lb. drop *(CW Market Newsletter, Aug. 22)*. New delivered tank price: 13¢/lb.

•

Carbon dioxide and carbon tetrachloride fire extinguishers used by the armed forces may eventually be replaced by hand-operated units containing monobromotrifluoromethane according to U. S. Army sources. The new chemical—developed at Fort Belvoir, Va.—can reportedly put out some types of fires twice as fast as conventional materials. Added advantage: it is useful in fire-fighting at extremely low temperatures; MBTF-filled units worked successfully against fires in ambient temperatures as low as 65 degrees below zero.

•

Lime production in '58 dropped 10%, to 9.2 million tons, from 10.3 million in '57. The loss was entirely in open-market lime, off 13%, to 7.4 million tons; captive lime output increased 4%.

SELECTED PRICE CHANGES—WEEK ENDING AUGUST 24, 1959

	Change	New Price
UP		
Lead metal, prime, pigs, N Y.	$0.01	$0.13
Lead, red, 95%, bbl., c.l., works	0.01	0.1525
Litharge, coml., powd., bbls., c.l.	0.01	0.1475

All prices per pound unless quantity is quoted.

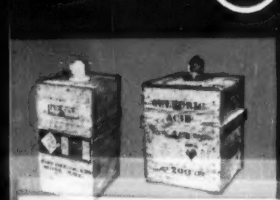
pure reagent acids

Reagent Acids by CORCO . . .
pure, uniform and prompt.
Quality products that rigidly
conform to the exacting
specifications required by analytical
and pharmaceutical laboratories,
precious metal, electronic and
atomic industries.

All CORCO Reagent Acids
are offered in 5 pint,
no-deposit,
no-return finger grip jugs
that feature a specially
designed "No-Drip" spout
to assure clean, precise pouring.
Distinctive color-coded cap
permits instant identification.
Special CORCO glass-lined
tank trucks insure
quality and prompt delivery.

Remember . . . highest quality,
uniform purity,
excellent customer service
and the very best
in packaging are yours
when you specify
CORCO Reagent Acids.

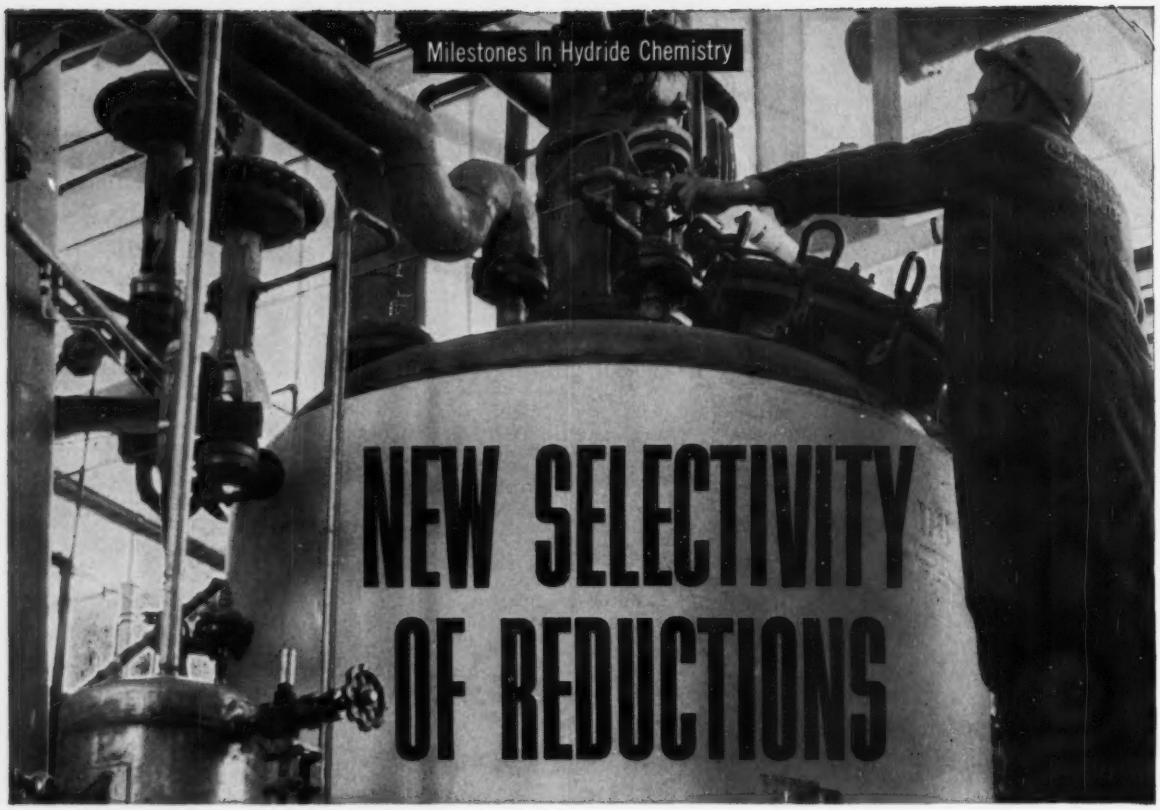
ACETIC ACID, GLACIAL
NITRIC ACID
HYDROCHLORIC ACID
AMMONIUM HYDROXIDE
SULFURIC ACID
HYDROFLUORIC ACID



CORCO

CHEMICAL CORPORATION / BRISTOL, PENNSYLVANIA

Send for further information



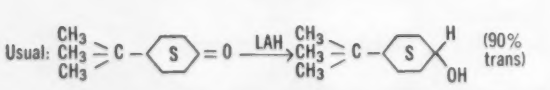
With MHI Lithium Aluminum Hydride

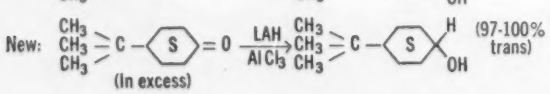
Development of new techniques for utilizing lithium aluminum hydride broaden the application of this powerful, ether soluble, reducing agent beyond aldehyde, ketone, ester and nitrile reductions. By combining other reagents with lithium aluminum hydride, mixed hydride systems are achieved that can be used to increase selectivity.

In some cases reactions take an entirely new course. In other cases stereospecific reductions occur. Here are a few example reactions which can be of great significance in the field of organic synthesis and especially for the synthesis of pharmaceuticals and natural products:

Usual: $RR'C(O)CHR'' \xrightarrow{LAH} RR'COHCH_2R''$ (Most substituted alcohol)

New: $RR'C(O)CHR'' \xrightarrow[AlCl_3]{LAH} RR'CHCHOHR''$ (Least substituted alcohol)

Usual:  (90% trans)

New:  (97-100% trans)

(In excess)

Usual: $RC_6H_4COC_6H_4R' \xrightarrow{LAH} RC_6H_4CHOHC_6H_4R'$

New: $RC_6H_4COC_6H_4R' \xrightarrow[AlCl_3]{LAH} RC_6H_4CH_2C_6H_4R'$

Usual: $o-NH_2C_6H_4COOH \xrightarrow{LAH} o-NH_2C_6H_4CH_2OH$

New: $o-NH_2C_6H_4COOH \xrightarrow[AlCl_3]{LAH} o-NH_2C_6H_4CH_3$

Usual: $C_6H_5OCH_2C_6H_5 \xrightarrow{LAH}$ no reaction

New: $C_6H_5OCH_2C_6H_5 \xrightarrow[CoCl_2]{LAH} C_6H_5OH + C_6H_5CH_3$ (Ether cleavage)

MHI lithium aluminum hydride is easy and safe to use. Reactions are rapid, yet easily controlled in conventional equipment. Reductions can be carried out at room temperature and atmospheric pressure. MHI Technical service is available to help you with your applications of lithium aluminum hydride.

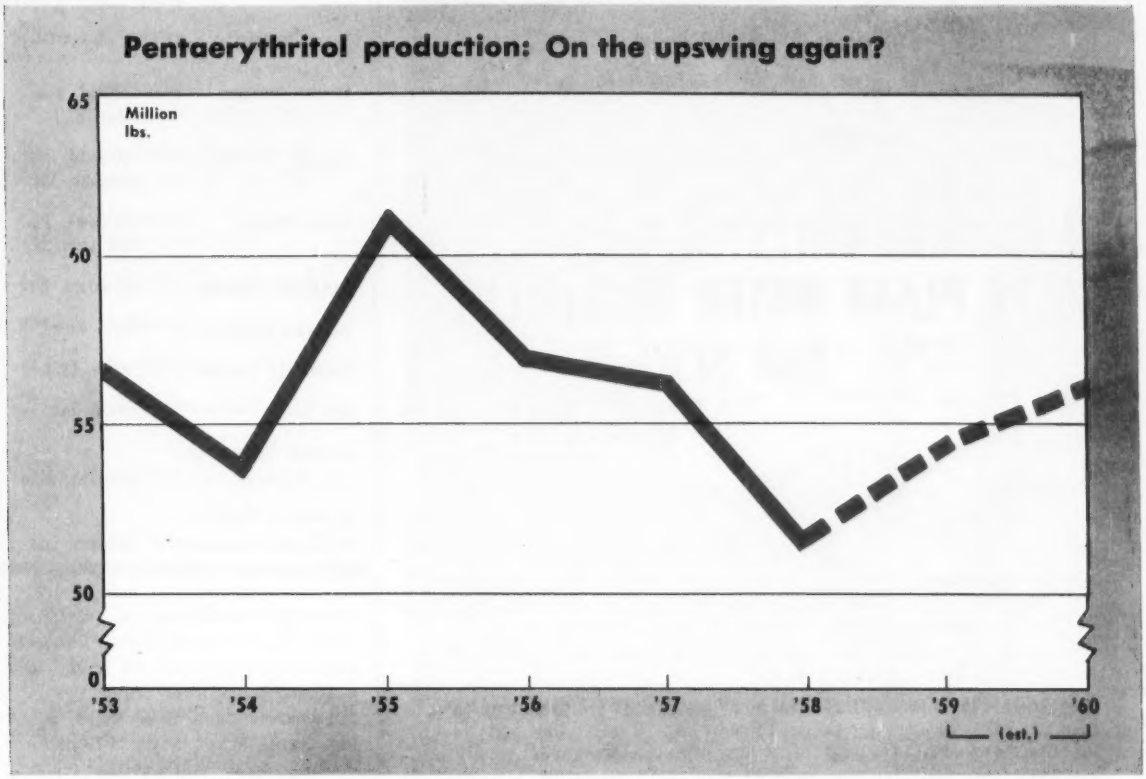
For complete information;
If you have not already received your copy, write for MHI's new booklet, "Selective Reductions of Organic Compounds with Complex Metal Hydrides" by Mark N. Rerick, University of Notre Dame.

CHEMICAL HYDRIDE DIVISION

Metal Hydrides Incorporated

PIONEERS IN HYDRIDE CHEMISTRY

829 CONGRESS STREET, BEVERLY, MASSACHUSETTS



Pentaerythritol Makes a Moderate Recovery

In the past 12 months, the U.S. pentaerythritol industry's bustling production has done much to dissipate the overcapacity that has plagued PE producers since '55. Now prospects for '59 appear brighter. With demand gaining strength, production is expected to rise to 55 million lbs. for the year.

As the industry's fortunes took a turn for the better, about 24.8 million lbs. of PE were turned out in the first five months of '59, compared with 19.8 million lbs. in the same period of '58.

This five-month pace is a continuance of a strong PE market resurgence that began in the latter half of '58 (August through December output was also about 25 million lbs.).

Industry capacity—now about 109 million lbs./year—is still more than adequate to handle the increased demands, although the overcapacity problem has been somewhat adjusted by the idling of two PE units this year: Hercules shut down its Mansfield, Mass., plant (capacity 20 million lbs./year), and Gulf Oil stepped out of the picture when it stopped pilot operations at its 1-million-lbs./-year operation at Conroe, Tex. And in '58, Trojan Powder halted construction of a 10-million-lbs./year expansion at Wolf Lake, Ill., after 60% of the unit had been completed.

Demand Stabilizing? Why the current high levels of demand? How long will it last? What is the outlook?

Improved business conditions, higher alkyd resin demands, and rebuilding of inventories by surface-coating producers all helped spur production during the last five months of '58, to run the year's total up to 52 million lbs.

A related factor was the low output of PE during the first half of '58, when many consumers of PE were working off available stocks rather than maintaining high inventories.

These same factors helped PE production and demand roll into '59 at a healthy level. Additional circumstances contributed to the next big surge, which came in March. Part of this increase arose out of fear of an industry-wide price advance. Tabs were to be increased from ½ to 1½ ¢/lb. on the various grades, e.g., technical PE from 29.5¢/lb. to 31¢/lb.

Many PE users went on a heavy buying spree before the new prices went into effect. Then, threats of a July steel strike, plus greater demand for phthalic anhydride and alkyd-based paints, continued to push production steadily upward during April and May. And, according to producers, demand in June and July was seasonally better than a year earlier.

Fast Pace Now: Thus, in the 10-month period from Aug. '58 through

Pentaerythritol

Company	Location
Heyden Newport	Garfield, N.J. Fords, N. J.
Hercules Powder	Mansfield, Mass. Louisiana, Mo.
Trojan Powder	Allentown, Pa. Wolf Lake, Ill.
Reichhold Chemicals	Tuscaloosa, Ala.
Delaware Chemicals	Staten Island, N. Y.
Commercial Solvents	Agnew, Calif.
Gulf Oil	Conroe, Tex.
Canadian Chemical Co., Ltd. (Celanese)	Edmonton, Alta.
St. Maurice Chemicals Ltd. (Heyden-Shawinigan)	Varennes, Que.

May '59, production was a shade lower than 50 million lbs. This was one of the highest output levels since a similar period in '56-'57.

Length of the steel strike is an important factor in the PE picture. A long strike could bring reduced inventories of phthalic anhydride-based products, e.g., alkyd resins, and with it the need to rebuild depleted inventories—spurring greater demand for PE. But realistic PE marketers are not ready to boast about an end of all their problems. Although many believe that '59 production will be around 55 million lbs., the figure is still a long way from the industry's high point of 61 million lbs. in '55, and far from capacity.

Coatings Tieup: PE's ups and downs are closely tied in with the surface-coatings industry, which accounts for about 90% of its end-uses. Oil-modified alkyds take the largest share of PE output. Because of inroads in the alkyd paint field by water-thinned paints—butadiene-styrene, vinyls, acrylates—PE makers have begun an intensive research program to develop new products and outlets for their material, make it less dependent on one industry. Already, several new applications are being field-tested.

Hercules has developed a high-molecular-weight chlorinated polyether, derived from PE. The material, tradenamed Penton, is being produced

Capacity Million pounds/year	Status
26	Producing
25	New plant, onstream Jan. '58
20	No longer producing PE
24	New plant, onstream May '57
15	Producing
10	Construction halted
12	Producing
6	Producing
1	Producing
1	No longer producing
18	Producing
3	Producing

in pilot-plant quantities at the company's research center near Wilmington, Del. But demand has outgrown supplies, so Hercules has started construction of a commercial plant at Parlin, N.J. It is slated to be onstream this fall. About two months ago, the company reduced the price of Penton more than 40%. Natural Penton, formerly $6/lb., is now sold at $3.50/lb. in 6,000-lb. quantities.

Heyden Newport, Celanese and Hercules have done extensive work on PE-based synthetic lubricants for both military and civilian jet-powered aircraft. Although aimed at a limited market (*CW, April 4, p. 69*), this research points up the industry's effort to get into new fields.

Meanwhile, Delaware Chemical reports that it is stepping up its research efforts on PE, and expects to start piloting several new PE derivatives within the next three to six months.

Plasticizers and heat stabilizing compounds made from PE are also finding use in vinyl chloride polymers and copolymers. Other PE products are being used successfully in fire-retardant coatings, which form an insulating layer when heated. And several other products based on PE are also subjects of intensive lab and field work.

Industry efforts in the next two or three years will be toward develop-

ment of these newer products. And, by '62, the market acceptability of the new PE-based products is expected to be pretty well determined, and may be the springboard for a new era of growth.

Meanwhile, PE's production curve in the next two or three years will likely continue its upward swing, growing about 3-4%/year.

Canadian Imports: Domestic producers still contend with imports from Canadian Chemical Co., Ltd. an affiliate of Celanese, which has an 18-million-lbs./year plant at Edmonton, Alta., and maintains six stock points in the U.S.

Canadian Chemical's favorable position in Canada — due to low production costs, plus integrated facilities—enables it to compete effectively in foreign markets where it has built a good trade. High costs have prevented U.S. producers from being competitive in the foreign markets; consequently, PE export sales are practically nil.

Reversal of PE's declining production, a current high output rate and the paring of overcapacity have helped ease some of the problems of producers. But it will be a long uphill battle, involving a lot of research and field work, before the industry will again be able to use its full manufacturing potential.

Drug Demand Climbs

Output of medicinals (in bulk) in '58 totaled 101.4 million lbs., 2.6% higher than the '57 figure of 98.8 million lbs., according to latest government figures.

Sales of medicinals also increased—the industry marketed 81.4 million lbs. of products vs. 80 million lbs. sold in '57, a 1.8% increase. However, dollar sales were off 3.6%, dropping from $576 million in '57 to $555 million.

Dollarwise, antibiotics (as a group) were the most important medicinals produced. Total output of all antibiotics, for human and veterinary purposes, was 2.6 million lbs., 8.3% higher than '57. However, sales were off, for the year. Only 1.9 million lbs., worth $304.7 million, were sold, a decline of 5% and 6%, respectively. Acetylsalicylic acid (aspirin) once again was the highest-volume item; 20 million lbs. were produced.

In paints, cosmetics, paper coatings and a thousand other applications,

WITCO STEARATES REPRESENT...
WITCO CHEMICALS AT WORK

TEN MINUTES TO TAKE OFF... just time for a final check. Our pretty young friend probably doesn't know it, but chances are her powder contains Witco Magnesium Stearate to increase its smoothness and ability to cling to the skin. This versatile stearate is also used as a highly effective emulsifying agent in many other cosmetics and pharmaceuticals.

THE SHIP'S A TRAMP, but "operation repaint" will soon have her looking smart as an ocean liner. In marine paints, quality is vitally important. That's why so many marine protective coating manufacturers—and other paint manufacturers, too—use Witco Aluminum Stearates. They depend on these stearates to improve pigment suspension, modify viscosity, reduce gloss and improve water repellency—factors essential for quality, long service life, reduced painting time and low costs. Witco's new Aluminum Stearate 119 finds use aboard ship, too, as waterproofing for manila rope. With this stearate, rope passes the conventional float test forty times better than with other stearates.

Photo courtesy Trans World Airlines

A THOUSAND WORDS ON Witco Calcium Stearate. Hundreds of thousands, in fact, for Witco Calcium Stearates are extensively used in paper-coating formulations to increase water resistance, improve flow properties, impart necessary flexibility and to insure maximum gloss and brightness. Other Witco stearates are used in printing inks to improve suspension and thickening and to reduce excessive tack.

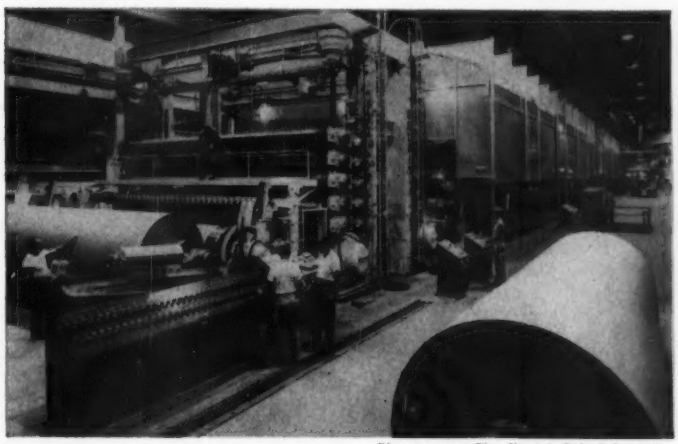


Photo courtesy West Virginia Pulp & Paper Co.

Dept. CW8

Witco Chemical Company, Inc.

122 East 42nd Street, New York 17, N.Y.

The comprehensive range of products manufactured by Witco and its Divisions includes:

- Stearates
- Stabilizers
- Driers
- Plasticizers
- Rubber Chemicals
- Gelling Agents
- Extender Pigments
- Specially prepared Bituminous Compounds and Mastics
- Synthetic Detergents
- Detergent Additives
- Spray-dried Chemicals
- Organic Chemicals
- Furnace and Channel Blacks
- Emulsifiers and Surface Active Agents for agriculture, foods, cosmetics, and other industries

Send me information on Witco products circled above for:

_____

_____

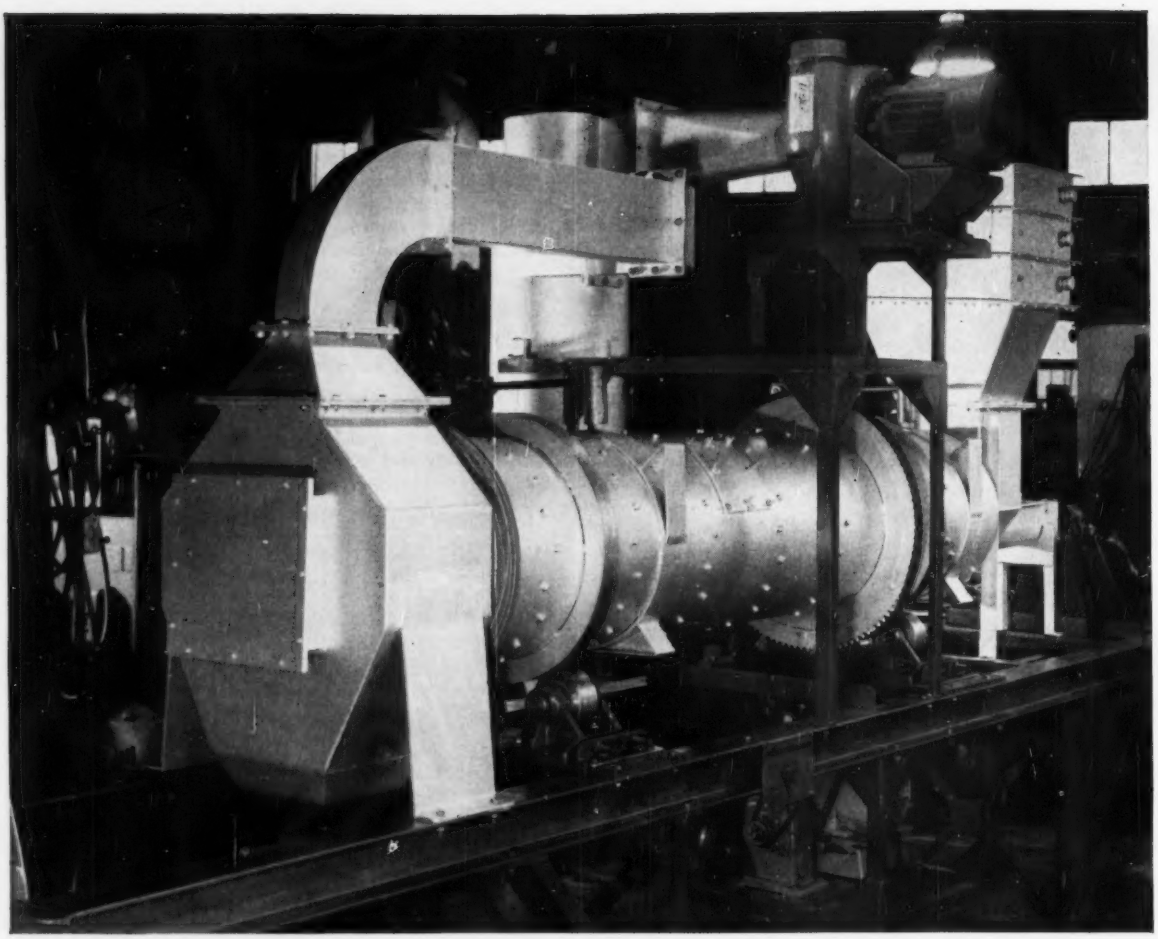
Name _____

Address _____

Company _____

City _____ Zone _____ State _____

14 Manufacturing Plants • 7 Research and Technical Service Laboratories
Sales Offices in Chicago • Boston • Akron • Atlanta • Houston • Los Angeles
San Francisco • Oakville, Ontario • London and Manchester, England



Pilot-scale Louisville Dryer available on rental or purchase basis

FOR RENT
PILOT PLANT DRYERS AND MIXERS

Rent this equipment when

1. The material changes physically or chemically on aging.
2. The material is hazardous and requires special handling by your own personnel.
3. Long duration tests are required for equipment evaluation.
4. Completion of a pilot plant is required at no additional capital expense.
5. Product security prevents release of samples.
6. Large quantities of finished product are needed for application studies.

Units are fabricated of stainless steel and are self-contained. Rental charges may be applied against purchase of production-sized equipment.

General American engineers will give technical assistance. If in-plant testing is not required, you can predetermine results at our complete East Chicago pilot plant. For further information, call or write. You'll find, *it pays to plan with General American.*

Available:	
Louisville Steam Tube Dryer	(1′ x 8′)
Louisville Rotary Reactor	(1′ x 8′)
Louisville Rotary Solvent Stripper	(1′ x 8′)
Louisville Rotary Vacuum Dryer	(1′ x 8′)
Louisville Direct Heat Dryer	(1′ x 8′)
Turbo RDC Extraction Column	
Turbo Bench Scale and Small Pilot Mixers	

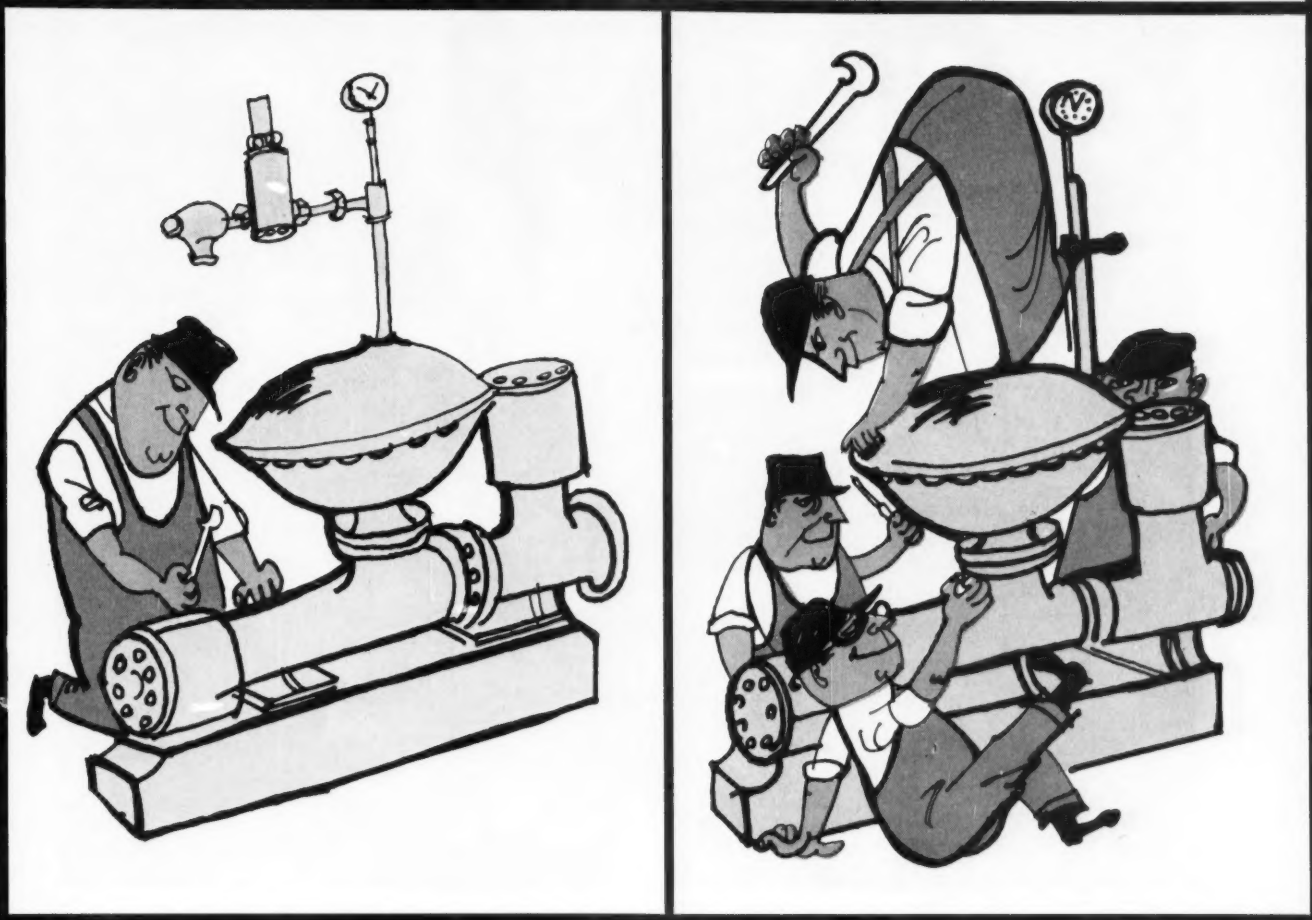
Process Equipment Division *Louisville Dryers*

GENERAL AMERICAN TRANSPORTATION CORPORATION

135 South LaSalle Street, Chicago 3, Illinois
Offices in Principal Cities
In Canada: Canadian Locomotive Co., Ltd., Kingston, Ontario

PROCESS EQUIPMENT DIVISION GENERAL AMERICAN TRADE MARK

What is the least number of men needed to repair equipment?



Statistics Show Human Side of Maintenance

A new look at the human factors of maintenance—the evaluation of attitudes, work habits—will be coming soon from a currently-in-progress study by the Aero Medical Laboratory of Wright Air Development Center (Dayton). Already, the study shows that worker skill isn't quite the sole determining factor as long supposed.

But more than that, the study is also giving clues on how to predict worker performance, statistically. Essentially, this early work shows, three major factors bear most strongly on estimates of which and how many maintenance personnel should tackle a job: (1) initial condition of the equipment, (2) the repairing skill of the men, (3) what is termed the "skill-difference" of them.

To the Air Force, maintenance (of aircraft) can have life-or-death consequences. To chemical companies, as equipment becomes more complex, determination of when or how equipment should be repaired is of vital operating and management concern.

Arriving at Probabilities: Melvin Warrick of the Psychology Branch of the laboratory suggested the study, which was conducted by George Wright, Richard Deininger (now with Bell Laboratories), James McGuire and Ralph Queal, Jr. They found that the Markov process, a simple form of probability theory that concerns sequences of events, fits the problem—at least in the less complex situations.

It was the Markov process that led to development of the three basic maintenance variables (parameters).

The initial condition of the equipment (the "machine probabilities") refers to the probability that the machine will or will not operate. As used at Wright, this parameter's limits are 1 and 0.

The repairing skill of the service

men and their so-called skill-difference qualities are the two most significant characteristics of the maintenance men (the "man probabilities"). The repairing-skill parameter describes the probability that inoperable equipment will operate after a maintenance man finishes checking and servicing it.

The skill-difference parameter is a characteristic found purely within the individual maintenance man, is considerably more complex than the repairing-skill parameter.

The Wright quartet explains it this way: A maintenance man possesses two skills. One is the repairing-skill parameter. The other is described as the probability that operating equipment will operate after a maintenance man finishes checking and servicing it. The skill-difference parameter is this second probability subtracted from the repairing-skill parameter.

Foul Up or Fix Up? The skill-difference parameter has been dubbed the "foul-up-fix-up" factor. Mathematically, it is simply defined. Actually, it is dependent upon complicated states of motivation, attitude or emotion. The ideal maintenance man, say the four researchers, is highly skilled in repairing equipment (i.e., his repairing-skill parameter equals 1), and his skills are well balanced (i.e., his skill-difference parameter equals zero).

Only one ideal maintenance man would be needed to service equipment to make it perfectly operable. Of course, as the quartet says, "such men are very rare."

A semiskilled man has a medium level of repairing skill and a positive skill-difference parameter. "Although this man may not be too good, at least he tends to leave well enough alone," say the researchers.

The extreme man who is poorly skilled and has a negative skill difference is not only incapable of repairing equipment, but also may damage equipment that is operating. The last type of maintenance man would be a psychiatric case, according to the researchers. His high repairing-skill talent would be matched only by his talent for damaging equipment.

When the three fundamental parameters were plotted graphically, the quartet of researchers found that even when the characteristics of the maintenance men seemed relatively satisfactory, chances are that certain repair situations couldn't be solved by them. For example, in one case, a number of maintenance men each with a positive skill-difference and about medium repairing-skill level will improve the probability of equipment operation after they are finished servicing the equipment. Yet, if they have the same skill-difference but slightly lower repairing skill, each man who services the equipment will actually lower the probability of its operation.

On the other hand, if the combination of skills makes it more likely that the equipment will operate after each man has finished servicing it, the case above doesn't hold. Theoretically, then, there is no limit as to the number of men who should be used. This does not consider costs in time or money.

More Sophisticated: The Aero Medical Laboratory's initial findings are reported in WADC Technical Report 58-543, available from the Office of Technical Information, U.S. Dept. of Commerce. But researcher Wright points out that this report is only the beginning. "We've had a lot more experience with the concept since the report was written. Our approach and answers are a lot more sophisticated now," he says.

Wright also says studies are continuing which will attempt to use data obtained from actual Air Force experience rather than hypothetical cases. He is anxious to stimulate the interest of industry. "Some companies undoubtedly have maintenance records that could be the basis for assigning actual values to many variables to which we have had to assign arbitrary values," says Wright.

Some companies, for example Du Pont, are studying equipment failures statistically (*CW, April 25, p. 79*). Du Pont also has planned maintenance shutdowns using a form of vector analysis and the aid of computers to cut process down-time. And many companies, like Canadian Industries Ltd., have refined statistical techniques for ratio-delay studies that tell just how much productive time is chalked up by maintenance men during a day (*CW, March 5, '55, p. 46*).

Much of this type of data could help complete the picture of the human side of the maintenance, both for the Aero Medical Laboratory of

August 29, 1959

tracers SECTION

(Classified Advertising)

F. J. Eberle, Business Mgr.

ADVERTISING STAFF

Atlanta 3 ..... Michael Miller 1301 Rhodes-Haverty Bldg., JAckson 3-6951

Boston 16 .. Paul F. McPherson, 350 Park Square Building, HUbbard 2-7160

Chicago 11 ..... Alfred D. Becker, Jr., R. J. Claussen, 520 N. Michigan Ave., MOhawk 4-5800

Cleveland 13 ... H. J. Sweger, Duncan C. Stephens, 1164 Illuminating Bldg., 55 Public Square, SUperior 1-7000

Dallas 1 .... Gene Holland, Gordon Jones, The Vaughn Bldg., 1712 Commerce St., Riverside 7-5117

Denver 2 ..... J. Patten, 1740 Broadway, ALpine 5-2981

Detroit 26 ..... H. J. Sweger, Jr., 856 Penobscot Bldg., WOodward 2-1793

Frankfurt/Main ..... Michael R. Zeynel, 85 Westendstrasse, Germany

London E.C. 4 .. E. E. Schirmer, McGraw-Hill House, 95 Farringdon St., England

Los Angeles 17, ... Robert Yocom, 1125 West Sixth St., HUntley 2-5450

New York 36 ..... Knox Armstrong, B. A. Johnson, P. E. McPherson, Charles F. Onasch, L. Charles Todaro, 500 5th Ave., OXford 5-5959

Philadelphia 3 William B. Hannum, Jr. 6 Penn Center Plaza, LOcust 8-4330

Pittsburgh 22 ..... Duncan C. Stephens, Room 1111 Henry W. Oliver Bldg., EXpress 1-1314

San Francisco 4 .... William C. Woolston, 68 Post St., DOuglas 2-4600

St. Louis 8 ..... R. J. Claussen, 3615 Olive St., Continental Bldg., JEfferson 5-4867

PRODUCTION

the Wright Air Development Center and for chemical companies. Adoption by many organizations of statistical techniques for maintenance studies is an indication that maintenance is rapidly losing its reputation as a necessary evil and gaining as one of the most important facets of plant operation.

EQUIPMENT

Fast Hydraulic Valve: Bendix-Pacific Division of Bendix Aviation Corp. (North Hollywood, Calif.) is out with a hydraulic valve that can be opened or closed within three-thousandths of a second. The valve's mouth diameter can be designed from 1- to 36-in. in size. Pressure range: up to 12,000 psi. The valve can be remotely actuated by electrical, electronic, hydraulic or pneumatic controls.

•

Heat Exchanger Salvage: W. F. Wells & Sons (Three Rivers, Mich.) is offering a new horizontal metal-cutting band saw specifically designed for salvaging the metal of heat exchangers. The machine will handle cross-sections of 60 x 60 in. and lengths of 18 in.

•

Weight Control: A new batchboard panel control for automatic weighing of as many as 20 ingredients is a product of Toledo Scale Corp. (Toledo, O.). The batchboard is 7 x 10 x 2 in., contains contact holes for each weight value. Plug wires are inserted into the holes to set the desired batch weight for each ingredient for single or multiple scales.

•

Cartridge Filter: T. Shriver & Co. (843 Hamilton St., Harrison, N.J.) is offering a new type of filter that combines the simplicity of a cartridge filter and the low-cost operation of a conventional precoat filter. Sizes: one to several hundred square feet of filter area.

•

High-Vacuum Gauge: Veeco Vacuum Corp. (New Hyde Park, N.J.) has a new combination unit for measuring pressures in the range from numbers 1000 microns to $5x10^{-6}$ mm. Hg. Designated the DG 2-2T, the unit combines two separate gauges—a thermocouple gauge and a Philips-type cold cathode discharge gauge—in one compact cabinet.

Tracers

TO THE CHEMICAL PROCESS INDUSTRIES

ADDRESS BOX NO. REPLIES TO: Box No. Classified Adv. Div. of this publication. Send to office nearest you.
NEW YORK 36: P. O. BOX 12
CHICAGO 11: 520 N. Michigan Ave.
SAN FRANCISCO 4: 68 Post St.

POSITIONS VACANT

Opening for research and development chemist experienced in manufacture and use of wax compounds, wax emulsions, resins, polymer dispersions, cleaners and household chemicals in a manufacturing company laboratory located in the Middle West. Apply by letter, enclosing photograph and giving full details of education and experience. All replies will be confidential. P-1975, Chemical Week.

Technical Service—An excellent opportunity for young man to join the Technical Department of the expanding Plastics Division of Spencer Chemical Company. This man should have a strong background in chemical engineering or chemistry, with a minimum of three years' experience in the field of polyolefins and nylon, and have intimate contact with field technical service work. In reply, please send detailed resume of experience, education and salary requirements to: Personnel Manager, Spencer Chemical Company, 610 Dwight Building, Kansas City 5, Missouri.

Experienced research and formulating chemist in the maintenance cleaner, cosmetics or skin cleanser field. Opportunity with expanding company. All replies confidential. Send complete resume of experience, education and salary requirements to: Personnel Manager, G. H. Packwood Manufacturing Company, 1545 Tower Grove Avenue, St. Louis 10, Missouri.

Plant Manager—Rapidly growing heavy chemical manufacturer in New Jersey needs a qualified man to manage one of its Sulfuric Acid plants. Experienced in sludge and burning processes is mandatory. Broader responsibilities will develop rapidly with our program of planned growth. Replies will be held in strict confidence. P-2361, Chemical Week.

Opportunity Knocks—There is an opportunity in our New York office for a young chemical engineer who thinks his real field is in selling. We are one of America's oldest and most firmly established manufacturers of corrosion-resistant materials and equipment. Our products cover a wide segment of industry and are accepted as top quality everywhere. The man we want should be in his late twenties or early thirties. We would be happy if he has had selling experience to industrial accounts. He must have the ability to meet and discuss products with technical and purchasing personnel. It's an attractive job right now—will be more attractive as the years go by. Please tell us all about yourself in a letter. Interviews will be arranged in New York. Write: P-2467, Chemical Week.

SELLING OPPORTUNITY AVAILABLE

Chemical jobber upstate New York, fine well-established line Industrial Chemicals, requires services experienced Industrial Chemical Salesman. Liberal salary, commissions, expenses. Car furnished. Opportunity advancement. Chance to buy into company over the years. If experienced, send resume to SW-2107 Chemical Week. Our employees know of this advertisement.

Salesman wanted—industrial chemicals. The two Carolinas and Virginia. SW-2343, Chemical Week.

A strong #2 man for our Chicago District Office. Our top man in Chicago has asked for a heads-up assistant with 3 to 5 years chemical sales experience to sell in Chicago and surrounding area. We manufacture surfactants, distribute nationally, have commanding position in several major product groups. Proper compensation, including expenses and car allowance. SW-2442, Chemical Week.

Petrochemical Sales Representative to be located in Dallas for travel in Mid West area. Chemical degree preferred but sales experience a necessity. Large company expanding in chemicals. Salary open. SW-2446, Chemical Week.

POSITION WANTED

Chemical Engineer—Chemical Sales Manager. Have successfully sold to Pharmaceutical, Food, Cosmetic & Chemical Industries. Desire challenging marketing position where experience can best be used to greatest advantage. Presently earning $10,000. PW-2466, Chemical Week.

POSITIONS WANTED

Sales Management position in chemical or allied by aggressive young man, married. Several years successful experience dealing with all types industry in Southwest, for leading chemical manufacturer. Prefer Southwest or Western U.S.A. PW-2309, Chemical Week.

Industrial Chemical Sales, Inside or Outside. 3½ years experience selling industrial chemicals in Metropolitan New Jersey. 10 years experience as Office Manager for filtration equipment manufacturer. Married with family. Prefer Metropolitan New Jersey-New York area. Mr. C. J. Haight, 931 Revere Drive, Hillside, New Jersey. Telephone Elizabeth 2-1933.

Successful Industrial Finishes Sales Manager interested in joining industrial finishes company or division in top level capacity. Seeking company or division not keeping pace with sales progress in to-day's expanding market. Personnel and facilities to keep abreast of sales potential and growth must exist or be provided. PW-2472, Chemical Week.

CONTRACT WORK WANTED

Custom Grinding-Ultra Fine or Course-Specialty or Volume Blending and Grinding service on unit or contract basis. Complete CO^2 installation for Nylon, Teflon and Heat Sensitive Materials. A Cramer Corp., 10881 S. Central Avenue, Box 682 Oak Lawn, Illinois.

One of Britain's largest and best known steel fabricators desires to contact American contractors to the Oil and Chemical Industries interested in having their specialized products manufactured under license in the United Kingdom. All facilities available for manufacture and machining fabrications up to 75 tons each. Please contact J. S. Moffat, Sales Director, Weldall & Assembly Ltd., 10 Norfolk Street, London, W.C.2.

Established Progressive Los Angeles Manufacturer seeks additional marketable products to produce and distribute to western markets under license on royalty basis. Now producing and selling industrial resins, specialty hydraulic cements, swimming pool chemicals, laundry supplies and specialty plastic materials. Will also consider production under private label or for your sales organization. Management is technically competent and quality conscious. You are invited to send complete details in confidence to CWW-2455, Chemical Week.

BUSINESS OPPORTUNITY

Montmorillonite—We own mining property in Nevada containing approximately 1,0000,000 tons of highest quality Montmorillonite Clay. Property has been thoroughly surveyed drilled and blocked out. Clay has been tested and proven highly efficient for catalyst or filtering. We desire to lease or sell property. Kinney Industries, 410 Solano Avenue, Los Angeles 12, California.

CHEMICALS WANTED

Surplus Wanted—Chemicals, Pharmaceuticals, Oils, Acids, Plasticizers, Resins, Dyes, Solvents, Pigments, Etc. Chemical Service Corporation, 96-02 Beaver Street, New York 5, N. Y. HAnover 2-6970.

FOR SALE

$3,000,000 Liquidation-Chemical Plant at Orange, Texas. Type 316 Stainless Steel Tanks, Kettles, Heat Exchangers, Columns, Stills, Crystallizers Centrifugals, Pumps, Valves, etc. Wonderful Values. Send for list. Perry Equipment Corp., 1415 N. 6th St., Philadelphia 22, Pa.

Bakelite BR-9432 Resin (Phenol-Formaldehyde) $.33/lb. (Orig. Bbls.). Carbon Tetrachloride—Redist. & Restabilized $.075/lb. (Bulk). TCP—off color 5 drums $.26/lb. DOA, Virgin, Off Color 10 drums $.35/lb. Barium Hydrox. N.F., (J. T. Baker Orig) 15 Leverpaks $.06/lb. DBM, Virgin, Off Color 30 drums $.15/lb. Wash Acetone, 100% Ketone w/w and dry $.07/lb. (Bulk). Lacquer Thinner, Off Color $.25/gal. (Bulk). FS-1898, Chemical Week.

2—500 gal. T316 stainless reactors. Vacuum internal. Jacketed. Agitators, drive & motor. Also (1) 750 gal. & (1) 350 gal. reactors. Perry Equipt. Corp., 1415 N. 6th St., Phila. 22, Pa.

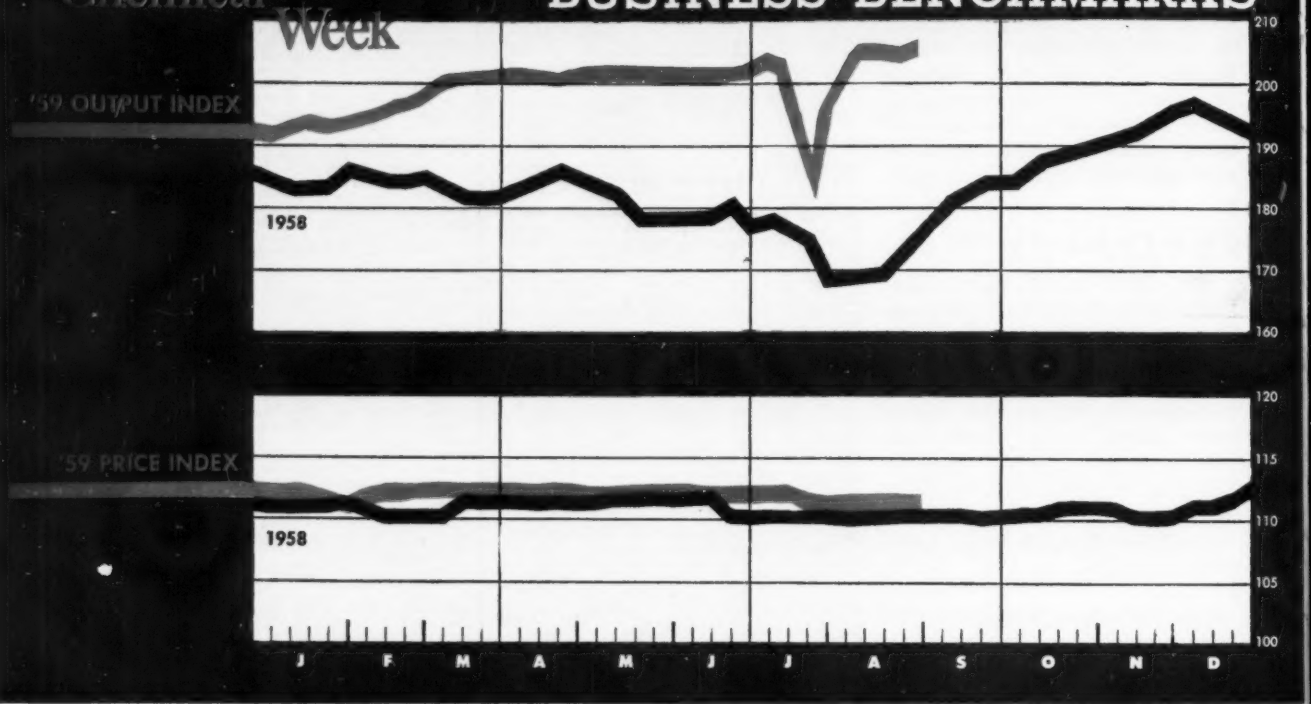
Old Issues Chemical Week—two (2) sets available, 1949-1957. Not bound. Buyers' Guide included, $50.00 per set or highest bidder. FS-2464, Chemical Week.

90% Methanol—20,000 gallons—20 cents/gallon. Suitable for anti-freeze. FS-2437, Chemical Week.

Approximately thirty used coiled tanks, size 2,000 to 20,000 gallons, plus two boilers, pumps, pipes, etc. "as is where is" to be removed from plant in Jersey. FS-2436, Chemical Week.

Chemical Week

BUSINESS BENCHMARKS



AUGUST 29, 1959

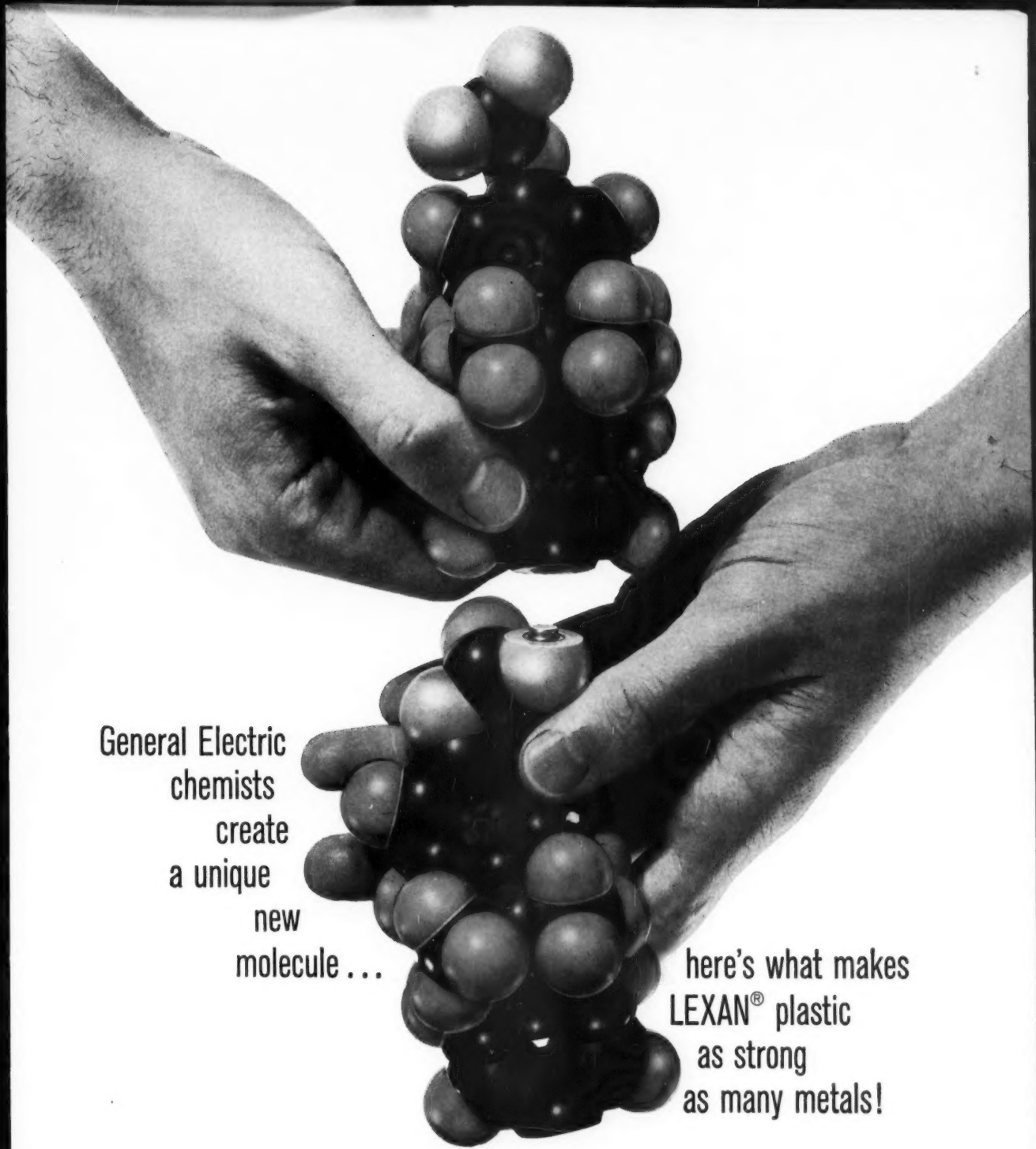
WEEKLY BUSINESS INDICATORS	LATEST WEEK	PRECEDING WEEK	YEAR AGO
Chemical Week output index (1947-1949=100)	206.2	205.4	178.0
Chemical Week wholesale price index (1947=100)	110.7	110.8	110.7
Stock price index (12 firms, Standard & Poor's)	59.13	60.05	43.97
Steel ingot output (thousand tons)	337	335	1,632
Electric power (million kilowatt-hours)	13,648	13,675	12,850
Crude oil and condensate (daily av., thousand bbls.)	6,823	6,789	6,839

MONTHLY INDICATORS—Wholesale Prices (1947-1949=100)	LATEST MONTH	PRECEDING MONTH	YEAR AGO
All commodities (other than farm and foods)	128.4	128.2	125.6
Chemicals and allied products	109.0	110.0	110.4
Industrial chemicals	123.9	123.8	123.1
Paint and paint materials	120.2	120.2	119.2
Drugs, pharmaceuticals and cosmetics	93.5	93.4	94.4
Fats and oils (inedible)	55.5	58.4	62.5
Fertilizer and materials	107.4	107.6	108.0

CHEMICAL CUSTOMERS CLOSE-UP

FACTORY SALES OF U.S. PASSENGER CARS

MANUFACTURERS' SALES OF TEXTILES



General Electric chemists create a unique new molecule . . . here's what makes LEXAN® plastic as strong as many metals!

Take a close look at the molecular model of LEXAN polycarbonate resin that this General Electric chemist is putting together, and you'll be able to see why this unique new plastic has metal-like strength.

Symmetrical shapes are always the strongest, and every part of this molecule is symmetrical. In addition, the black and orange sections are very close-packed – nothing can penetrate them – and the small black and grey sections contain tremendous energies – are extremely hard to pull apart.

The LEXAN molecule was carefully built for strength by General Electric researchers through their intimate knowledge of chemical "building blocks" and the properties they can impart to a material. The unique plastic they have created – tough as many metals – is already proving its value in over 100 different industrial applications.

Through chemical research and discovery, General Electric creates new materials – new products – new opportunities. General Electric Company, Chemical and Metallurgical Division, Bridgeport, Connecticut.

Progress Is Our Most Important Product

GENERAL ELECTRIC

Silicone Fluids, Emulsions, Resins, Rubbers • Phenolic Molding Powders, Foundry Resins, Industrial Resins • Fused Magnesium Oxide • METHYLON® Coating Intermediates • LEXAN® Polycarbonate Resins • Mica Products, Varnished Cloths and Papers, Electrical Insulating Paints, Varnishes, Permafils, Wire Enamels, IRRATHENE® Insulation • TEXTOLITE® Decorative and Industrial Laminates • Man-Made Diamonds • Vacuum Melted Alloys • CARBOLOY® Cutting Tools • Permanent Magnets • Wire and Cable • Conduit Products • Wiring Devices • West Coast (Anaheim, California): GLYPTAL® Alkyd Resins • Polyester Resins

PANASOL

Aromatic Solvents

a cut above other solvents for pesticide formulating

Pick the product you want to formulate, and you'll find a PANASOL Solvent you will want to use in your formulation. PANASOL Solvents offer high aromaticity and solvency to help you make quality products *competitively* priced. The low phytotoxicity of PANASOL RX-4 and AN-2K permits you to use them with assurance in crop sprays. Mild odor and light, clear color of PANASOL AN-2 makes it suitable for household spray formulations. PANASOL AN-1 and AN-3 are useful in such specialty formulations as Insecticide-Fertilizer combinations. The ease with which PANASOL Solvents formulate with active ingredients simplifies manufacturing.

The whole PANASOL Solvent story is in the hands of your Amoco Chemicals salesman. He's ready to bring it to you when you call. Or write for Bulletin A2. Your inquiry will receive immediate attention.

Typical Properties

PANASOL Solvent No.	AN-1	AN-2	AN-2K	AN-3	AN-5K	RX-3	RX-4
Distillation 2F., ASTM	D-158	D-158	D-158	D-158	D-158	D-86	D-850
IBP, °F.	400	420	398	450	440	276	282
EP, °F.	494	520	525	534	705	—	—
DP, °F.	—	—	—	—	—	360	320
Specific Gravity, 60/60°F.	0.974	0.986	0.950	0.997	0.943	0.843	0.865
Aromatics, Vol. %	98	99	82	99	71	76	94
Mixed Aniline Point, °F.	55	54	75	54	100	84	59
Flash Point, COC., °F.	190	210	200	225	220	—	—
Flash Point, TCC., °F.	—	—	—	—	—	82	85
Solubility*							
DDT (tech.)	39	42	39	43	28	25	29
BHC (tech.)	29	34	41	31	43	23	28
Lindane	9	10	11	14	5	10	15
Dieldrin	26	28	26	27	25	26	29

*Wt. parts in 100 parts solution at 32° F.

AMOCO CHEMICALS

AMOCO CHEMICALS CORPORATION

910 South Michigan Ave., Chicago 80, Illinois

Varnishes, Permafils, Wire Enamels, IRRATHENE® Insulation • TEXTOLITE® Decorative and Industrial Laminates • Man-Made Diamonds • Vacuum Melted Alloys • CARBOLOY® Cutting Tools • Permanent Magnets • Wire and Cable • Conduit Products • Wiring Devices • West Coast (Anaheim, California): GLYPTAL® Alkyd Resins • Polyester Resins